JPRS-UEN-84-013

18 May 1984

USSR Report

ENERGY

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-UEN-84-013

18 May 1984

USSR REPORT

ENERGY

CONTENTS

FUELS

ENERGY CONSERVATION

GENERAL

UDC 621.643/553.002.2+62.001.7

SHCHERBINA DISCUSSES OIL, GAS INDUSTRY

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 1, Jan 84, pp 1-5

[Article by USSR Minister of Construction Enterprises of the Oil and Gas Industry B.Ye. Shcherbina: "The Fourth One, the Decisive One!"]

[Text] The Soviet people under the guidance of Lenin's party, having attained great achievements in the development of the economic system, increasing well-being and reinforcing the country's power, have begun the fulfillment of the assignments of the fourth, decisive year of the 11th Five-Year Plan.

Its scale and the paths for attaining the goal were determined by the decisions of the December (1983) CPSU Central Committee Plenum and the Ninth Session of the USSR Supreme Soviet. The conclusions and provisions contained in the text of the speech by Comrade Yu.V. Andropov formed the basis of the work of the party and state, and were approved by the workers. Their fulfillment is a pledge for our further achievements.

The workers in the sector at the construction projects of the oil and gas industry began the new year in good spirits. They had done no little work in the past three years.

1983, the middle year of the five-year plan, was stressful for the sector, far from simple, demanding great exertion of forces, mobilization of all reserves, concentration of resources and additional improvement of the organization and administration of capital construction, above all in the oil and gas industry, and fulfillment of the assignments of the Food Program, and of the light, food and machine building industries.

For the first time in the history of the sector the volume of construction and installation work reached 5.2 billion rubles, and increased by almost 500 million rubles in a year.

Undoubtedly, the chief result lies in the fact that the construction workers, in conjunction with the workers in the gas industry, with the tremendous and invaluable assistance of the CPSU Central Committee and the USSR Council of Ministers, due to the active work of the local party, soviet and trade union organs, the Komsomol and the self-sacrificing work of the metallurgists, machine builders and transport workers, fulfilled ahead of schedule and put into operation the transcontinental gas pipeline Urengoy-Pomary-Uzhgorod,

unique in the technical-engineering respect, and it became the symbol of our era. The coming years and decades will forever inscribe this feat of the people in the annals of domestic industry.

Along with the giants of the past achievements of the gas pipeline system from Western Siberia to Western Europe, there is yet another convincing proof of the might of domestic science, technology, economics and capacity of the socialist planned system through its own efforts to solve major economic problems and problems of political importance.

The struggle for the laborious kilometers of the unique gas pipeline was unfolded under the conditions of an exceptionally keen foreign policy battle. The embargo of the White House, with which President Reagan tried to frustrate the construction of the gas pipeline, brought disgrace and humiliation to transoceanic politicians.

The construction of the gas pipeline seemed to be the halfway mark of the five-year plan. On one hand, it put into effect the experience of the past, and on the other hand--was the model, the turning point, after which there should follow new summits, the building of a new level, higher quality and reliability.

A substantial result of the past years is a further rise in the efficiency of our sector.

On the eve of the 66th anniversary of the October Revolution the construction program for three years of the five-year plan was completed. It increased by 40 percent over 1980.

Labor productivity achieved the level projected for the end of the five-year plan, and increased during these years by 21 percent. Basic purposeful tasks for the oil and gas industry were resolved. All the gas pipelines from Siberia that were constructed were put into operation ahead of schedule. Every month of the ahead-of-schedule putting into operation of this pipeline yields 50 million rubles of national economic effect. Putting into operation the export Urengoy-Uzhgorod mainline ahead of schedule is worth a total of several hundred million rubles.

The effect obtained from the output for the projected capacity of the gas pipeline in its launching year and the corresponding development and building up of the fields is of no small significance. It is in this precise rhythm that the construction of the gas industry is now being carried out. Three of the earlier-constructed gas pipelines, Urengoy-Ukhta-Gryazovets-Moscow, Urengoy-Petrovsk and Urengoy-Novopskov have been brought to planned capacity. The stage introduction of the gas pipeline Urengoy-Uzhgorod as early as June permitted a daily supply of over 20 million cubic meters of gas to the industry of the Urals. By bringing this system to the planned capacity, and this will occur in the first half of 1984, the country will emerge in first place in the world for gas extraction!

The proportion of the oil and gas complex in the national income produced in the country grows with every year.

The CPSU Central Committee and the USSR Council of Ministers highly appreciated the success of the sector's workers, particularly their putting the gas pipeline Urengoy-Pomary-Uzhgorod into operation ahead of schedule. A large group of workers and specialists were awarded orders and medals of the Soviet Union. Comrades V.Ya. Belyayevyy, V.V. Martynov and A.F. Simvolokov were awarded the title of Hero of Socialist Labor.

The workers in the sector are grateful to the party's Central Committee, the Central Committee Politburo, the Presidium of the USSR Supreme Soviet and the government for their high appreciation of labor, and take it as an expression of confidence in the fact that the construction workers will make a new contribution to fulfilling the country's Power Engineering Program and the plans for national economic development and to reinforcing the power of our native land. The construction workers are fulfilling this mandate of the party and the Soviet people.

The high evaluation gives a new burst of energy and a new stimulus for great deeds and achievements.

Despite the complicated yearly circumstance of autumn and the beginning of winter, the starting rhythm of construction projects did not weaken, by day or by night. Will, energy and creativity and the ability to organize construction in an involved situation have withstood the elements. Most of the collectives have accomplished the purposeful tasks of the year and three years of the five-year plan.

During the past years the increase in oil extraction was 16 million tons, including gas condensate, and of gas--101 billion cubic meters. Almost all the increases were provided by Western Siberia. Today Siberia is yielding 60 percent of the oil and 50 percent of the gas extracted in the country. The construction volumes in Siberia exceeded 2.5 billion rubles a year.

In order for the riches extracted from the earth's interior to be delivered to the consumers without interruption, just in the last year over 14,000 kilometers of pipelines and 75 compressor and pumping stations were constructed and put into operation. Turned over for operation were the oil pipelines from Pavlodar to Chimkent (1642 km), from Groznyy to Baku (602 km) and others, and 10,000 kilometers of gas pipelines and product pipelines for various purposes. Building around the oil and gas deposits in Western Siberia, Kazakhstan and the Komi ASSR, and a number of other regions has continued. The industrial enterprises have overfulfilled the production plans for all the indicators--commodity, selling and normative net output.

The sector has successfully coped with the year's assignments for the output of industrial products: pipes for oil pipelines, metal structures, excavators, pipe layers, swamp-crossers, motor-vehicle-trailers and automation instruments and devices. Some 800 million rubles of capital investments, directed toward the development of the construction industry production base, have been assimilated.

At the Urengoy deposit, planning and construction of gas-preparing units with a capacity of 20 billion cubic meters a year each have been developed in brief periods. Some of them were put into operation at Urengoy last year. A large number of wells were connected up. The fulfilled program makes it possible for the gas industry to give firm assurance of fuel for the national economy and to have the necessary reserve for this.

New enterprises with great importance for the chemical industry were put into operation.

Among the projects constructed for other ministries and departments are capacities for the output of: depth rods and pipe-layers at the Ocher Machine-Building Plant, tanks to transport liquid fertilizers at the Neftekamsk Dump Truck Plant, hydraulic cylinders at the Tuymazy Concrete Carrier Plant, non-woven materials at the mills in Tuymazy and a cotton-spinning mill in Neftekamsk with 39,000 spindles.

A considerable number of apartment houses, schools, children's centers, hospitals and polyclinics were turned over for operation.

In accordance with the program for social development of the sector, about 2 million square meters of housing for workers and office workers in the sector were made operative during the 3 years. The CPSU Central Committee criticized us justifiably for shortcomings in housing construction. A great deal was rectified in 1983, but liquidating the 2-year debt still has to be faced.

The ministry coped with the assignment for the agro-industrial complex. The sector's contribution to putting the Food Program into effect is characterized by putting into operation capacities to process 120 tons a day of oilseed at the Bayram-Ali Oil and Fat Combine and for the production of machines and equipment for livestock breeding and feed production at the Belebey Testing-Experimental Plant for Industrial Equipment, worth 8.2 million rubles, putting into operation poultry farms for 100,000 laying hens, a 6-hectare hothouse combine at the Mayskiy Sovkhoz in the Tatar ASSR, complexes and farms for raising 1200 head of cattle, 3400 head of calves and 1260 hogs.

Considerable attention has been paid to expanding subsidiary agriculture. By the end of 1983 there were 32 agricultural enterprises in the sector's organizations and enterprises. The livestock population with respect to cattle doubled as compared with 1982, and to hogs--1.6-fold. The level of sales for meat, milk and other agricultural products rose. Seven additional new subsidiary farms are slated for establishment in 1984. Unfortunately, the organizational period at the subsidiary farms is dragging out. New collectives are being formed slowly.

The positive results of the year and the three years of the five-year plan make it possible to draw certain conclusions on the general order of things.

An indispensible condition for successfully carrying out capital construction, and surmounting its state of inertia is a thorough and obligatorily advanced

preparation of enterprises and organizations and development of their capacities. This is particularly important to open up new regions.

In connection with the accelerated construction, forthcoming in the 11th Five-Year Plan, of projects for pipeline transport, a program was outlined for technical re-equipment of the sector. It was specified that the construction workers, in the 11th Five-Year Plan, increase 1.5-fold the rates of constructing the gas pipelines, and the nation's industry has oriented itself to supplying the sector with new machines, equipment and instruments in order to approximately double the power available per productive unit of the ministry's enterprises.

Putting this program into effect has made it possible in the time that has elapsed to vastly increase the power available per productive unit in the sector, and in pipeline construction almost double, and ahead of schedule, in 1983, to fulfill the commission of increasing 1.5-fold the rates of line work at the gas pipeline routes.

In the past year the industry began series output of a new grade of electric welding units, "Sever" and "Styk", which will bring a fundamental change into the technique of building pipelines. Another two or three years will be required for construction projects to be fully equipped with these automatic units, and for skilled welders to be freed from monotonous work and to be engaged in creative work--installation and complex jobs at centers and large projects.

The sector itself has done a good deal to equip enterprises with new machines, mechanisms, instruments, structures and goods. The building of a set of machines for laying gas pipelines in the regions of the Far North has been completed. Machines are now being prepared to lay out fully-formed trenches in permafrost soils, platforms have been produced as an air cushion and the production of "Tyumen" four-wheel drive vehicles has been expanded.

Of course, merely re-equipping without the skill to use the resources does not solve the matter.

Re-equipment, for example, of the pipeline-production works and setting up the corresponding structures for controlling this type of quite complicated construction changed the situation fundamentally and for the better. This cannot be said, however, of the electrical engineering work, even though here the same arrangement for refurbishing and improving the control has been put into effect. The matter lies above all in the personnel and in the procedure formed in the organization. It is also the lesson of the past years of the five-year plan and from it the correct conclusions must be drawn.

Preparation of construction production required divisions of functions among the organizations performing the work for the gas and oil industries and establishing new main administrations and trusts in the regions. The decision has already been made now to form a trust for building up around the Yamburgskoye deposit. A main administration has been formed in Uzbekistan, and structures have been built to open up the Astrakhan gas condensate deposit,

and deposits in Western Kazakhstan. Even though the birth year of these organizations was 1983, their tasks will grow rapidly, and they must increase the capacities vigorously.

Operational-production planning should become increasingly situational, active, taking into consideration the changing circumstances, and should affect production. The territorial production-managerial main administrations established have been oriented toward prompt maintenance, and raising executive discipline. It cannot be said that this unit is coping in full measure with its duties. The orientation of the economic system and of all the nation's industry toward capital construction, as the sector's experience teaches, is an extremely important means of programmed state value, and will rapidly correct the situation in this sector of the economic system.

A basic factor for the sector was the resolution of the CPSU Central Committee, adopted in 1982, on problems of developing scientific-technical progress in oil and gas industry construction.

A determining factor for the scientific and technical level of the sector and its output was the constant concern for the development of the sector's science and its laboratory-production base and drawing basic science into the problems of oil and gas industry construction. Every five to seven years in our headlong age there is a change in technology, production organization and knowledge itself. The more science-intensive production becomes, the more urgent the requirements for drawing fundamental science into the economic system.

In working out the schemes for the 11th Five-Year Plan, the ministry, in conjunction with the USSR Academy of Sciences and the Academy of Sciences of the Ukraine established broad research programs and introduction of the achievements of science and production. Fulfillment of these programs made it possible to, and on a growing scale will make it possible to achieve qualitatively new results at construction projects and enterprises.

Our sector's scientific activity is considerable. Our concern is to organize rapidly the work of the recently established institute for pipeline transport of coal and minerals--a new direction in the sector's activity. Industrial construction from NIPIorgneftegazstroy [not further identified] anticipates a high return.

The sector also makes wide use of the scientific potential of the nation's VUZ's. Over 50 of them are carrying out joint creative work with the ministry. Automated supersonic units to monitor welding quality that are new in principle, with high resolving power, and operating under winter conditions are being built in conjunction with the Moscow Higher Technical School imeni N.E. Bauman. Work is being done in conjunction with the Moscow Construction Engineering Institute imeni V.V. Kuybyshev on designing new heat-insulation material, and with the Ufa Petroleum Institute--on binding soils. The Moscow Institute of the Petrochemical and gas Industry is taking an active part in developing the technology for construction of heavy-duty main pipelines up to 1420 mm in

diameter, using pipes with plant and base-stock insulation, applying a unified flow of earth, welding-assembly and insulation-laying work, and in the working out of a means to build underwater crossings by the method of directed drilling.

Quite a few problems still remain, however, requiring an urgent theoretical and methodological solution. Taking into consideration, for example, the growth of the power capacity of pipelines and laying main lines in a unified technological passage, a theory of reliability must be developed for super-capacity main long-distance pipelines. Study must be continued on developing corrosion-resistant pipe steel, pipes made of filled polymers, the methodology of determining the corrosiveness of soils in consideration of biological factors must be improved and proposals must be worked out for the composition of covering materials and the technique for applying them to the pipelines, while ensuring an essentially new level of protective properties and impact-resistance.

Considerable work has been done in the sector on introducing new equipment and technology. Just recently, over 200 developments have been put into practical use in construction. Assignments for construction of objects made of large components, assemblies, panels and blocks, with full prefabrication of the supporting and enclosing structures have been successfully carried out, as have those for the introduction of the complete-block method. The volume of completely prefabricated construction was worth 2.9 billion rubles. Some 780 million rubles were used in the use of the complete-block method.

Fulfilling the plans for putting new equipment into operation is in many ways conditioned by the target-program approach, adopted in the ministry, to solving the most important problems. The activity of the scientific-research, planning-design and construction-installation organizations and enterprises were aimed at realizing the scientific-technical programs approved by GKNT, USSR Gosplan, the USSR Academy of Sciences and USSR Gosstroy, and also the sectorial scientific-production programs.

Continued in the sector were the introduction of advanced methods of organization and stimulation of labor, advanced production experience, more efficient utilization of work time, search for an economic mechanism that would make it possible to generate by its own nature self-adjusting systems of production hierarchy, aimed at the end result--putting projects into operation. In the sector's organizations and enterprises the use of brigade contracting has considerably expanded. Using this method last year construction and installation work worth 2 billion, 200 million rubles, or 45 percent of their total volume was fulfilled.

Intensifying the role of production collectives, broad organization of experiments and of raising the level of management and operations and introduction everywhere of brigade contracting is a task of primary importance, requiring the constant attention of the directors of social organizations and enterprises.

In 1982, in three trusts of Glavtruboprobodstroy [Main Administration for the Construction of Pipelines] an experiment was made with respect to the wages

of collectives of combined production lines in accordance with a unified lump-wage payment system based on the averaged-out cost [by wage] per kilometer of pipeline. The results of the experiment confirmed the efficiency of seeking new forms of organization and material incentive for labor. Now being completed is the transition of all the combined production lines working on the gas pipeline runs from Siberia, to cost accounting and the wage principles verified in the course of the experiment at the sections of V.Ya. Belyayeva, L.V. Mikhel'son and A.F. Pen'yevskiy.

The transition of the industrial enterprises to planning and evaluating in accordance with normative net output has been completed. New indicators have been introduced, determining the cost price of the output--the limit level of expenditures per ruble of construction-installation work and commodity output, as well as the level of materials input in construction and industry.

Taking into consideration the two-year practical work experience of the Ukrtruboprovodstroy and Zaktruboprovodstroy trusts, a procedure was worked out for planning and evaluating labor on the basis of normative conditional net output (NUChP). From the beginning of 1983 all the construction-installation organizations of Glavukrneftegazstroy and Glavyuzhtruboprovodstroy, including 11 trusts and 64 construction-installation administrations, were transferred to planning and labor evaluation according to the new indicator. Electronic computer equipment was introduced at Glavukrneftegazstroy to automate the accounting of the volumes of normative conditional net output for structural elements and normative-reference basis on machine mediums. Established on their basis is a unified sectorial system of processing planning estimates, improving the preliminary estimate and accountability and planning the NUChP indicators to serve all the construction subdivisions of the ministry. The construction organizations were converted to the normative method of planning the wage fund per ruble of volume of construction-installation work or the normative conditional-net output.

However, the experiments in introducing NUChP require further serious critical analysis.

The progress should not lull us and engender only a feeling of satisfaction. On the contrary, we should still further mobilize outselves and adjust ourselves to overcome our imperfections.

Despite the achievements, the economic mechanism in the sector still does not sufficiently stimulate intensification of production and does not orient the economic, socio-psychological and legal attitudes of the workers, engineering and technical personnel and office workers toward obtaining the high ultimate national economic results with minum input of resources.

In the past year a number of enterprises and trusts did not cope with their assignments. The work activity of Glavtyumenneftegazstroy was lower. As before some trusts of "Soyuzgazpromstroy" are working unsatisfactorily. One third of the sector's organizations are not coping with the goals for economic indicators, for example, such as for profits. The sector's production and technical potentials are not being fully utilized. Many machines and mechanisms are operating 10-11 hours in a 24-hour period. The best units require repair services. Cases of mismanagement, wastefulness and poor work quality have not been overcome.

All this attests to the fact that we have not succeeded everywhere in reaching a high level of responsibility and performance discipline of the personnel. The ministry was obliged to remove a number of trust and organization directors from the posts occupied by them and to make good at their expense part of the material damage inflicted on the construction projects through their fault.

Unfortunately, it cannot be said that the struggle to reinforce planning, state and technical discipline is at the level with us that the party demands. Substantial corrections must be introduced into the style and methods of the ministry's work and into all the units of the administrative sphere.

Considerable reserves for intensification of the sector have been put toward raising the quality and degree of completedness of the construction work.

The lagging behind in construction of surface projects has still not managed to be fully overcome. Along with fulfilling the assignments for putting compressor and pumping stations into operation at the most important pipelines, there was no assurance of turning over for operation a number of compressor and pumping stations at other systems. Oil capacities, cable and radio relay communication lines have not been introduced in full quantity.

Work at the Surgut House Building Combine to develop a new building material--azerite--should be completed extremely quickly. The unit for its preparation is estimated for 300,000 tons output. Launching it will ensure a substantial reduction in input for housing construction, and will also give other benefits.

Given the conditions of an acute shortage of workers, there is a poor reduction in downtimes and losses of work time, and in a number of organizations the personnel turnover exceeds 30 percent.

Despite measures taken, the advantages of concentrating internal capital investments in under-way construction projects have not been fully utilized. Some 96 projects have been included in the plan as opposed to 149 in 1982. The goal for putting production capacities into operation, however, has not been fully fulfilled. Less than 10 percent of the investments have been directed toward technical re-equipment and modernization of existing enterprises for the output of reinforced concrete items, machines, mechanisms, pipe assemblies and castings.

Orientation of socialist competition toward raising the qualitative indicators for construction is insufficient. Directivity of the competition toward the utmost production intensification must be strengthened.

Because the complete equipping was not done on time, we and the oil workers did not succeed in putting into operation certain capacities for oil treatment and a number of pipelines at gas-lift stations. Work at the Lokosovskiy Gas Refinery and the Var'yeganskiy Compressor Station was performed with gross violation of the deadlines.

The results of 1983 must be carefully analyzed and the necessary conclusions be drawn in order for construction to be better organized and its mobility and efficiency increased.

The construction organizations have entered into the new year of 1984, having accumulated tremendous reserves, experience and the ability to solve major problems. The scale of our activity and geography of the projects are growing considerably. The work volume will exceed 5 billion, 350 million rubles. As before, 96 percent of it will be fulfilled by our own efforts. For this it is necessary to tighten up all the construction units, to balance our resources and to concentrate them according to the time and priority of the tasks.

The structure of capital investments is becoming more complicated. The volume of surface work exceeds 54 percent as opposed to 48 percent in preceding years. This means that the labor intensiveness will increase, the labor input will grow, and consequently the task as a whole will become more complicated.

The pipeline construction volume remains just as high as in preceding years.

The task of constructing the oil line Kholmogory-Perm-Klin, 2400 kilometers long, moves to the foreground. This main line will give a new outlet of Siberian oil to consumers and will stimulate an increase in its extraction. The gas line from Urengoy to the Center, 3020 kilometers in length, should be constructed.

Construction and putting into operation is specified for the products line from the regions of Tyumen Oblast to the European section-Western Siberia-Urals-Volga area (1456 km), and building up the oil deposits in Tyumen Oblast, Western Kazakhstan, Bashkiria, Tataria and Udmutria. It is particularly important to take in hand the building up of the fields in Tomsk and Perm oblasts and the Komi ASSR, where no small amount of lagging behind has been allowed by the trusts and main administrations. Construction of projects for gathering and utilizing oil and petroleum gas, and of compressor stations for gas-lifting will continue. The main products line Travniki-Kustanay-Amankaragay, 321 kilometers in length, and others are also to be put into operation.

A considerable work volume is slated for fulfillment at the Urengoy deposit, and work should be begun at Yamburg.

The development of the gas condensate region of Western Kazakhstan (Karachaganakskoye deposit), building up the Astrakhan deposit, developing the underground stores in Turkmenia and Uzbekistan and constructing a new gas refinery in the Uzbek SSR are very important.

A special and new task in the year that has begun is the organization of extraction, transport and condensate processing in the Urengoy region. The program for building up this deposit and construction of the condensate line Urengoy-Surgut and the condensate stabilization unit in Surgut will

increase sharply this year. Production of diesel fuel at Urengoy must be set up, making it possible to supplement the volume of motor fuel consumed in this region.

It is particularly important to overcome the lagging behind in the construction of headers and lines at Urengoy. This is a priority assignment for Glavsibtruboprovodstroy and the trust carrying out the build-up of the field. The Urengoy Main Administration, picked up a fair rate of speed in 1983, should maintain it, not waste time and use the winter period to deliver building materials and equipment to the sites.

Further development is slated for the sector's production base. The volume of normative net output is specified to reach 201.5 million rubles--an increase of 3.9 percent over 1983. The planned growth of industrial production should be ensured mainly by virtue of a further rise in labor productivity and better utilization of capacities both at existing enterprises and those to be introduced. Particular attention will be paid to developing capacities for the output of industrial structures--block-boxes, also forming unitized housing. The production of building materials will increase by 3.3 percent, and the machine-building output--by 3.4 percent.

In 1984 the Ministry of Construction of Oil and Gas Industry Enterprises will begin to construct coal lines in the country. The first route will be the pipeline Belovo-Novosibirsk, which should be completed in the current five-year plan. At the same time, coal lines will be constructed as "turnkey" --a method which is the highest form of economic operation and in which we see great reserves for raising the efficiency of all capital construction.

The plan for 1984 specifies the construction and putting into operation of 13,900 kilometers of main pipelines, including 10,400 kilometers of gas pipelines and 3500 kilometers of oil lines and petroleum product lines, 63 compressor stations with a total capacity of 3.8 million kilowatts, 20 pumping stations, with an oil capacity of 652,600 cubic meters and a capacity for processing 3 billion cubic meters a year of natural gas, and 11,400 kilometers of radio relay and cable communication lines.

The fate of the year's plan, just as before, will depend on how the sector comes into action in the North, how we are able to concentrate efforts and means in the winter period. Already, in the first quarter of 1984, 26-27 percent of the year's program must be fulfilled, and in the pipeline main administrations--32-34 percent.

The sector's tasks in the non-production construction sphere are increasing. First of all, everything possible must be done to establish a broad work front for the organizations of Moscow, Leningrad, the Ukraine and the Baltic republics that have been drawn in and are constructing housing for the gas and oil workers.

The house-building capacities should be more fully utilized. To do this we must improve the work of the Tyumen House Building Combine, build up the capacities of the Vizilinskiy Plant for the output of volume-block houses, and further develop production of dormitories and mobile homes for special settlements.

A large volume of construction-installation work has been outlined at projects of the agro-industrial complex: the Belebeyevskiy Testing and Experimental Plant of the Ministry of Machine Building for Animal Husbandry and Fodder Production, the Buzuluskiy Machine Plant of the Ministry of Tractor and Agricultural Machine Building, the Bashkir Sugar Plant No 4, a bakery in Buzuluk, poultry farms in Turkmenia, livestock breeding complexes in Tyumen Oblast, Tataria, Bashkiria and other projects.

A substantial volume of work is specified for fulfillment abroad.

In the circumstance that has formed for the sector's collectives, there must be a continuing construction of outlets for the purpose of converting electric power stations to gas. We coped with this task in 1983, but matters will be no less serious in the future.

The Ministry of Construction of Oil and Gas Industry Enterprises, jointly with other sectors of the national economy should take a more active part in fulfilling programs to expand the use of natural gas as motor fuel--this is an important aspect of the nation's Energy Program.

An extensive scientific-technical program is to be put into effect in 1984.

The Energy Program and the rates at which it is put into effect require new search and development, a further acceleration of scientific-technical progress in the sector and activation of the work of the Scientific-Technical Council, institutes and design organizations. The basis of this work is the resolution of the CPSU Central Committee and the USSR Council of Ministers of 18 August 1983 on "Measures To Accelerate Scientific-Technical Progress in the National Economy" and the measures for its fulfillment, worked out in the sector.

The machine-building, chemistry and instrument building subsectors should solve in a clear-cut fashion the tasks that have been imposed on them. Through a saving in materials and electric energy they could organize the production of additional output and more actively participate in the output of goods for national consumption.

Fulfillment by the sector of the year's program should be accompanied by a rise in work quality and introduction into all the production processes of labor- and power-saving production techniques. One of the main features of this year is the general struggle for thrift and economy. The highest saving of fuel, power and materials must be achieved.

There must be more wide-spread dissemination of the experience of leading brigades and innovators, and valuable initiatives and new ideas.

It is very important that the subdivision directors are able to use highly patriotic qualities of production collectives such as vocational maturity, creative activity and work initiative--on this too rests the fate of the year's plan.

It is for us to solve one of the national economic problems formed--the development of productive forces--and we are obliged to be guided by the requirement of time and the party. "The main path to a qualitative upsurge in productive forces," noted Comrade Yu.V. Andropov, "is, of course, the transition to intensive development and combining in deed the advantages of our socialist system and the achievements of the scientific-technical revolution."

The working collectives of the organizations and enterprises of the Ministry of Construction of Oil and Gas Industry Enterprises should still more widely develop competition using the motto of "Work Efficiently and With High Quality", and should with perseverance work on fulfilling the planned assignments and the socialist commitments adopted for the five-year plan.

In determining the goals for 1984, we are obliged to give guidelines to the organizations for 1985, the concluding year of the five-year plan. Subject preparation of the plans for the 12th Five-Year Plan should be begun.

There is an actual possibility of making 1984 a year of ahead-of-schedule fulfillment of a number of major tasks specified by the five-year plan for the oil and gas industry, which will make it possible to put into effect successfully the plans for the five-year plan as a whole.

In the complex international circumstance and the increased imperialist aggressivness, the Soviet people are solving the grandiose problems of the economic and social development of the Motherland and are single-mindedly supporting the domestic and foreign policy of the party and the state.

In order to give a shattering rebuff to the forces of reaction and war, from each of us are required cohesion, a high degree of organization, watchfulness, and self-sacrificing labor, rousing the economic and defense might of the country in the name of peace and the safety of nations.

12151
CSO: 1822/198

TYUMEN GAS ASSOCIATION SETS 1984 PRODUCTION TARGETS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Jan 84 p 1

[Text] Carrying out the decisions of the 26th Party Congress and the November 1982 and June 1983 CPSU Central Committee Plenums, the labor collectives of the Tyumengazprom Association have successfully fulfilled their socialist obligations for 1983. They have produced for the economy about 3.4 billion cubic meters of gas above the plan level. They have also overfulfilled their tasks for labor productivity increase, fuel-energy resource savings and other technical and economic indices.

Workers, engineering and technical personnel and office staff of the association enthusiastically approved the decisions of the December 1983 CPSU Central Committee Plenum. They unanimously support the positions and conclusions contained in the speech of CPSU Central Committee General Secretary Yu. V. Andropov. In striving to make a worthy contribution to the fulfillment of the tasks set forth by the Plenum they accept the following socialist obligations for 1984:

They will ensure the largest annual increase in gas production, 44 billion cubic meters, in the history of the gas industry. This will be done by utilizing 1) the accelerated introduction of new production capacity and the more efficient use of existing capacity for producing and transporting gas, 2) the introduction of new equipment and progressive methods, 3) the efficient use of working time and 4) the further strengthening of labor discipline. They will give the economy 2 billion cubic meters of gas more than the planned amount. They will overfulfill their task for labor productivity growth by 1.1 percent.

On the basis of an improved economy system, more efficient use of raw materials, fuel, power and other material resources, they will save 100,000 tons of standard fuel, 115 million kilowatt-hours of electricity and 100,000 gigacalories of thermal energy. They will implement a series of measures for reducing production costs. On that basis, they will reduce their production cost by 0.6 percent compared to the plan, earning 10 million rubles in above-plan profits. They will increase the creative activity of the workers and accelerate the implementation of innovations and inventions. The economic gain from this will be 4.2 million rubles.

They will increase the efficiency of capital investments. Together with the construction organizations, they will put the Urengoy-Tsentr-1 gas pipeline into operation: build 348,000 square meters of residential space, preschool establishments for 1,430 children, 9 schools for 3,558 children and a polyclinic. They will increase the qualifications of 5,300 workers and train 2,700 new workers in key professions.

They will increase the volume of agricultural production in the association's subsidiary farms by 10 percent over last year and produce 28 kg of meat and 50 kg of milk per person.

The workers, engineering and technical personnel and office staff of the association assure the Leninist CPSU Central Committee and the Soviet government that they will upt all their efforts, knowledge and experience into implementing the decisions of the December 1983 CPSU Central Committee Plenum, fulfilling the 1984 plan ahead of schedule and realizing the USSR Energy Program.

We call upon the labor collectives of the gas industry and the construction ministries who are building the sector's facilities to make socialist competitioe more widespread in order to fulfill the 1984 and five-year plan tasks ahead of schedule.

The socialist obligations have been discussed and approved at meetings of the association's collectives.

12595
CSO: 1822/213

STEAM INJECTION INCREASES OIL RECOVERY

Moscow EKONOMICHESKAYA GAZETA in Russian No 3, Jan 84 p 9

[Article by I. Nikolayev, engineer: "Oil Recovery With Steam"]

[Text] The Yarega field in the Komi ASSR contains a uniquely heavy crude oil. From the very beginning, the oil has been recovered by underground mining. Otherwise, the total formation recovery would not exceed 2-3 percent. Most of this most valuable raw material would have remained buried. When the possibilities of underground mining had been exhausted, oil recovery was not over 10 percent. Then steam came to the aid of the oil workers. Injecting it into the formation prolonged the life of the three oil mines here.

Production has been steadily rising and has exceeded by two and one-half times the previous maximum annual output. Oil recovery rates in some areas have reached 50-60 percent.

At present, the high-pressure steam extraction of oil produces over one-quarter of the output from new methods that were specified in the special scientific and technical program, realized in the 11th Five-Year Plan, for intensifying oil field development and increasing formation output to 55-60 percent. Thermal steam formation injection, on industrial and test-industrial scales, is being done in 14 oil fields in West Kazakhstan, Ukraine, Tatar ASSR, Checheno-Ingush ASSR and other regions.

This highly effective method is basically simple. Steam is pumped through injection wells. It literally pushes the oil to the recovery wells. When so heated, even the heaviest, high-parafin oils become more fluid. The oil flow resistance in the well decreases.

Over the past three years of the five-year plan, the volume of oil recovered by steam injection has more than doubled. At present, there are 62 steam generator units operating in oil fields. About half of these units were put into operation in the years 1981-1983.

Experiments have begun to inject steam into the deep formations of the Novo-Suksinsk, Gremikhimsk and Usinsk oil fields. At Usinsk, an additional 230,000 tons of oil have been recovered using this method.

In 1983, an interagency commission approved the first domestically built steam generators, which produce 60 tons of steam per hour at 160 atmospheres of presuure or 50 tons per hour at 60 atmospheres. The total amount of steam pumped has now reached 5.1 million tons per year.

At the same time, the Oil Industry Ministry has not fulfilled, for the recent period, the planned tasks of the special program for the development of thermal steam treatment of oil formations. Because of this, 700,000 tons of oil were not recovered. The Aktyubinskneft' Association permitted the greatest delays. The Ministry of Chemical and Petroleum Machine Building and the Ministry of Power Machine Building have broken schedules for equipping sites with progressive steam-injection equipment. These shortcomings must be rectified by the end of the five-year plan.

The introduction of new methods for increasing oil recovery is making a more noticeable contribution to the realization of the country's Energy Program. Furthermore, this pace can be and should be higher.

12595
CSO: 1822/213

BRIEFS

IMPROVEMENTS AT SURGUTNEFTEGAZ--V. Zhilyakov, the author of the article, "Make Greater Demands On Yourself," published in SOTSIALISTICHESKAYA INDUSTRIYA on 20 August 1983, raised the question about delays at the production base of the Surgutneftegaz Association's administration of oil recovery increase and well capital repairs. In his answer, the chief engineer of that administration, N. Zakharchenko, admitted that the criticism was justified. He further writes that Glavtyumenneftegaz has repeatedly pointed out the shortfall of repair resources and production bases to Surgutneftegaz, noting that this shortfall has caused the unacceptable condition of the production wells. The association has been ordered to add 13 well workover brigades and give top priority to assigning living space to well workover personnel and well maintenance brigades. Measures are also to be taken to solve the problems brought out in the article, "Make Greater Demands On Yourself." In particular, a central production service base is to be established in the first quarter of 1984. Measures are being developed to increase the labor productivity of well workover brigades by widely implementing cost accounting and by progressive organization of labor in all services and links responsible for the steady operation of the basic brigades. Glavtyumenneftegaz will oversee this work. The personnel problem was also solved: the management of the Surgutneftegaz Association's administration of oil recovery increase and well workover has been strengthened. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 28 Jan 84 p 2] 12595

DRILLING SUCCESS ON CASPIAN--(AZERINFORM)--The largest metal island in the Caspian Sea has truly become a treasure island. On the night of 17 November, as a hurricane raged over the sea, the fourth production well (No. 102) on stationary platform No 2 began flowing. The platform is situated over the Imeni 28 April Field, almost 100 km from Baku. The well yields more than 300 tons per day. The first three wells, penetrating 100 meters of water to the multiple formation, produce about the same amount. The new well, inclined 750 meters from vertical, was drilled by the brigade of foremen Gasanbala Isayev and Valid Mamedov. Despite difficult drilling conditions and furious storms which occasionally struck the rig, the friendly drilling collective, headed by drilling chief Mamedaga Aliyev, completed the drilling ahead of schedule. Hundreds of thousands of rubles were saved for the government. This was a result of the efficient

use of each minute of working time, the highly productive use of the turbodrill and the skillful selection of diamond drill bits for cutting and other types of drill tools. Drilling is to begin shortly of the third pair of wells from the artificial island. These wells will be inclined 1,100 meters from vertical in opposite directions. Twelve wells are to be drilled there in all. [Text] [By A. Gol'denberg] [Baku VYSHKA in Russian 18 Nov 83 p 1] 12595

KHARKOV TETS NOW GAS-FIRED--(RATAU)--Urengoy gas has come to Kharkov: the largest TETs in the oblast, TETs-5, has been converted to run on the blue fuel from Siberia. It took construction workers of the Ministry of Construction of Petroleum and Gas Industry Enterprises and the Yugozapadenergostroy Trust only several months to put the 35-km branch line from the Urengoy-Uzhgorod main line into operation. The large-diameter pipes were laid through a heavily populated area and across transportation arteries. The creation of f unified spread speeded up the job. Conversion of the heat and power station to natural gas will annually save the economy 390,000 tons of fuel oil, which was previously used to fire the plant. Specific fuel consumption per unit of energy generated decreased due to the increase in boiler efficiency. [Text] [Kiev PRAVDA UKRAINY in Russian 8 Jan 84 p 1] 12595

OFFSHORE FOUNDATION PLANT OPENED--Baku, 11 Feb--The first-phase construction of the deep-sea foundation plant has been completed. This plant is provided for in the decisions of the 26th CPSU Party Congress. The plant will produce steel islands: stationary platforms, from each of which drillers will be able to drill 12 wells in water depths up to 200 meters. This will greatly broaden the ability to search for new oil and gas reserves in the Caspian Sea. The plant has its own "experimental sea" for testing the man-made islands. [Text] [By L. Tairov] [Moscow PRAVDA in Russian 12 Feb 84 p 6] Steel islands for the oil industry will be produced by the deep-sea foundation plant being built in the suburbs of Baku. This plant, the largest of its type in the country, is to produce 60,000 tons of structures per year, on which platforms will be mounted. These will be installed on the Caspian Sea floor at depths of 100 meters and more. Some sections of the plant are now ready. [Text] [Moscow PRAVDA in Russian 3 Feb 84 p 1] 12595

ASTRAKHAN DRILLING PLANS--Astrakhan--The wildcatters of the Astrakhan Drilling Administration have gotten the new labor year off to a good start. The brigade of communist V.I. Konchakov has been drilling at a high rate. Since the beginning of January, the brigade has gone significantly faster than its daily task. In the coming year the brigade has promised to cover an additional 500 meters of territory over plan. They have decided to drill the production well to its projected depth of 2,300 meters in 53 days, rather than 68 days. The brigade of V.U. Narayev has also met its well drilling schedule. They are also nearing the projected depth of the hole. The plan calls for 17 production wells and 33 exploratory wells to be drilled. [Text] [By A. Golovko] [Moscow SEL'SKAYA ZHIZN' in Russian 20 Jan 84 p 1] 12595

GROUNDWATER PROPERTIES AID PROSPECTING--(TurkmenINFORM)--The first well drilled at the Sandykachi site in the Karakum Desert struck a gas deposit. To estimate the deposit's potential, scientists of the Turkmen Scientific Research Geological Exploration Institute took advantage of the fact that various substances from oil and gas enter the surrounding groundwater. "Hydrogeological scientific estimation methods," said A. Ch. Karryyev, chief of the mineral solution research group of the Institute, "are now reliable and precise thanks to the work of the institute's staff. We have just completed some very interesting work in the Karakum Hydrogeological Basin. This work established that the nearby presence of oil and gas is best indicated by an increased content of organic matter and certain elements in the groundwater and by high levels of gas saturation. We have developed a group of hydrogeological quantitative indices for use in oil and gas exploration." Exploration parties searching for natural fuels in the Karakum are given recommendations, based on groundwater studies, for deep drilling at sites in Sabur, Karadzhulak, Chirli, Chokrak and several places. [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 3 Jan 84 p 2] 12595

IMPROVEMENTS AT CASPIAN PLATFORM--(AzerINFORM)--The Caspian Sea, which has over 300 stormy days per year, is no longer able to prevent the oil workers of NGDU's Bakhar imeni Serebrovskiy [Oil and Gas Production Administration] oil rig from arriving at their post on time. A helicopter pad has been built to allow the workers to come by air. Production was automatic after the site was refurbished. Now, there is no need for oil and gas well operators to make rounds of the wells several times a day. Automatic sensors record the necessary parameters and transmit them to the section control panels. As it reviews production and weather data, a computer will be able to efficiently determine optimum well operating conditions and even advise the foremen of measures which must be taken to ensure these conditions. For a long time the Bakhar oil workers have needed to ensure a more reliable power supply. At first, it was decided to lay a new electric cable to the rig. However, this could not be easily done due to the rough seas. Besides, no cable can be completely reliable. Therefore, it was decided to build a small, 200-kilowatt power plant on the rig. The plant is now operational. This will make it possible to convert all other Bakhar wells to the progressive gaslift method. [Text] [Baku VYSHKA in Russian 16 Dec 83 p 1] 12595

TURKMENGAZPROM PERFORMANCE POOR--The republic's gas producers owe over 200 million cubic meters of "blue fuel" to the national economy since the first of the year. The Association's staff, headed by V. Taldayev, has not met the government plan in four months. This delay is caused by frequent equipment breakdowns and a low level of worker qualifications. New reservoirs are being developed one after another in the republic, while there is at the same time a shortage of personnel. Crews are shifted from one site to another, trying to somehow plug all the holes in the dike. The construction workers at the sites have let the oil production workers down. Since the beginning of the five-year plan, the Turkmenneftegazstroy Association (headed by A. Sviridov) has done 22 million rubles of construction and installation work less than planned, delaying the start-up

of production at Uch-Adzhi, Gugurtli, Naip and Severnyy Balkui. The workers of the Sredazelektrospetsstroy Trust (headed by R. Kalanov) of the Ministry of Power and Electrification have also proved to be unreliable. As a result, at a number of facilities, gas workers have been forced to use temporary power supply systems, which naturally causes additional difficulties. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Feb 84 p 3] 12595

COMPRESSOR STATION STARTS UP--Krasnoarmeyskoye, Chuvash ASSR--(TASS)--The Zavolzhskaya Gas Compressor Station has begun operation on the main Urengoy-Pomary-Uzhgorod Pipeline. The first unit of the station has been put into operation. The Zavolzhskaya station was built on the Chuvash section of the transcontinental gas pipeline significantly ahead of schedule. The expertise of the construction and installation workers, as well as the workers' relay-race competition helped speed the completion. For instance, the Volga workers closely collaborated with the machine builders of the Nevskiy Zavod Association in Leningrad, where the 25-megawatt gas pumping units were built. Construction of the second phase of the Zavolzhskaya station has begun. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Feb 83 p 1] 12595

STEAM EXTRACTS HEAVY CRUDE--Ukhta, Komi ASSR--Over the past 15 years, 10 million tons of steam have been injected into the Yarega reservoir, where crude oil is recovered by the unusual underground mining method. That's how much heat was required to extract the extremely viscous oil. When the temperature in the producing formation increases, the heavy crude becomes sufficiently fluid. Thanks to this, oil extraction has increased by many tens of times. In only two months of this year, hundreds of tons of this unique oil have been produced in excess of plan. The local refinery produces particularly valuable lubricating oils from this crude. [Text] [By A. Kurkov] [Moscow PRAVDA in Russian 9 Mar 84 p 1] 12595

NEW GAS DEPOSIT--The first wells of a new gasfield in Ivano-Frankovsk Oblast, the Chernobusskoye, have yielded commercial gas. The specialists of the Kalush deep drilling expedition are continuing prospecting operations in the area. They are about to complete two more wells which will soon yield gas. [Text] [Kiev Domestic Service in Russian 0900 GMT 6 Jan 84 AU]

BOGORODCHANY GAS COMPRESSOR STATION--The Bogorodchany Compressor Station on the Urengoy-Uzhgorod gas main was put into operation recently--3 months ahead of schedule. This is a great success scored by Soviet specialists and GDR builders who were building this facility. It is to be noted that the Bogorodchany Compressor Station is the third one on the export gas main. [Text] [Kiev Domestic Service in Ukrainian 0500 GMT 7 Jan 84 AU]

CSO: 1822/253

INTERVIEW WITH USSR COAL MINISTER

Moscow PRAVDA in Russian 14 Jul 83 p 3

[Interview with USSR Minister of the Coal Industry Boris Fedorovich Bratchenko by N. Alekseyev and I. Tikhomirov; data and place not specified]

[Text] Progressive Collectives Reach High Levels...

[Text] At the Krasnoarmeyskugol' association's Krasnolimanskaya Mine, V. Ignat'yev's crew produced 600,000 tons of coal from the working face in 6 months and 13 days. Considering the short amount of time, this is a high level. How is it possible to maintain such a tempo?

"The technology makes it possible and the organization of labor guarantees it," is the crew leader's terse answer to the question.

The level of fuel extraction actually increased as the technology was improved: thanks to coal-extraction complexes, it became possible to push the loads on the face to 1,000 tons per day. Meanwhile, Ignat'yev's crew is now mining three times as much coal as that. This means that the major part of the increase was provided by those measures that Vladimir Ivanovich lumped together under the far-reaching words "organization of labor."

Only now and then do the fireflies that are the miners' lamps flash in the 200-meter-deep shaft: only a few people control a huge coal-extraction complex. But they do, indeed, work--like clocks. And the "weight" of each minute amounts to three tons of coal sent upward.

"Krasnolimanskaya" is rightfully the name of a testing ground for new technology: dozens of innovations that are determining factors in the progress made in the branch were tested right there. A troublesome business, to be sure. However, technical re-equipping enabled the mine to reduce the number of shafts by half and increase the load on them by an average factor of four.

The results achieved there exceed significantly the branch averages. And the miners are convinced that they can work even better. Here we are talking about the total utilization of internal reserves. The absence of a small part at the necessary moment sometimes forces the stoppage of a powerful complex that produces half the plan for the entire mine. Because of the inadequate reliability

of some assemblies of coal-cutting machines, each new increment in extraction is achieved with greater difficulty. But it has to be done. This means that it is necessary to see that the flow of coal increases without interference.

...So why Does the Branch Lag Behind? The Minister Now Has the Floor

[Question] The report from Donetsk arrived at our editorial offices almost simultaneously with the news that the coal industry is the only industrial branch that did not meet its plan for labor productivity in the last 6 months. What is the explanation of the lag and in what measure is the experience of progressive, 1,000-ton crews being used to improve work efficiency in mines and cuts? These questions led us to the USSR Minister of the Coal Industry B.F. Bratchenko.

[Answer] The outstanding success of V. Ignat'yev's crew is an example of what can be done by a well-trained collective when there is a clearcut organization of labor, high discipline and a proprietary attitude toward the business. That crew's miners made a commitment to dig 1 million tons of coal this year and they are confidently ahead of schedule.

We in the ministry are following such highly productive collectives carefully: we take their commitments into consideration when planning the branch's work and every month we analyze the results produced by each crew and its working conditions, right down to the length of the face and the thickness of the seam. And they are something else! Although they make up only one-seventh of the working face miners, the 1,000-ton crews take care of more than 40 percent of the underground extraction of coal in this country. This is why our goal is the active dissemination of the experience of these leaders and an increase in the number of such collectives.

This movement, which was engendered in extraction sections, has been maintained by mine tunnelers and cut excavators, transport workers, builders and machine builders throughout the branch. In 7 years the total number of highly productive crews has increased from 1,300 to 2,800.

[Question] However, the number of 1,000-ton collectives engaged directly in the extraction of coal has decreased in recent years, and the losses are being made up for very slowly.

[Answer] Every year the ministry is setting goals for the production associations for the organization of these crews. This year, for example, the number of faces with a 1,000-ton load should be increased to 500. That number is completely realistic, since the total number of complexly mechanized faces exceeds 1,360. However, I am forced to admit that what has been planned has not yet been realized. For the last 6 months, only 417 crews worked in the 1,000-ton mode instead of the 446 that were supposed to. The Ukrainian SSR Minugleprom [Ministry of the Coal Industry] permitted underfulfillment of the assignments, along with the All-Union Kuzbassugol' association and the Tulaugol' and Chelyabinskugol' associations.

It is worst of all when positions that have been achieved are given up because of enterprise leaders and because the struggle for high loads at the face does

not receive the necessary engineering support. That is what happened at the Ukrzapadugol' association's Mine imeni 60-letiye SSSR, where a 1,000-ton face was being worked as long ago as May, but the conversion to the new crew concept will be able to be made only in July. At the Makeyevugol' association's Mine imeni Pochenkov, a crew that had been converted to the 1,000-ton mode did not reach its planned load because of poor ventilation of the face.

I was recently visited by one of our well-known masters of coal mining: two-time Hero of Socialist Labor Mikhail Pavlovich Chikh, from the Mayskaya Mine. Last year, despite deterioration of the geological mining conditions, his crew remained true to itself: it sent up more than a million tons of fuel. Right now the collective is working a coal seam less than a meter thick, but even so is remaining in the ranks of the 1,000-tonners. Such an example, and worthy of imitation!

The movement for a high load at the face is being developed in Karaganda and Vorkuta better than in other places. At the Yuzhkuzbassugol' association, for example, an average of 1,039 tons of coal per day are being extracted from a complexly mechanized face, and in Inta the figure is 1,149 tons.

The base for further propagation of initiative is being strengthened: the supplying of spare parts is being improved, and after a long delay the plan for preparatory work began to be fulfilled (although preparation of the extraction front is still our weak point). The first complexes for working seams 0.75-0.8 meters thick are being tested. One of these complexes produces 450-500 tons of coal per day at the Rostovugol' association's Sokolovskaya Mine.

Thanks to the measures that have been instituted, the amount of coal extracted by the 1,000-tonners has increased by 13.6 million tons since 1975, and from 330,000 to 430,000 tons, on the average, for each crew. However, labor productivity in the branch is still actually below the planned figure.

[Question] At the beginning of the year, PRAVDA wrote about B. Dzegan, a section chief in the Krasnoarmeyskugol' association's Mine imeni Stakhanov, who took charge of a lagging collective and was able to arouse the miners' labor initiative and enlist them in the solution of the section's problems. Beginning from a level of 100 tons of coal produced per day, the miners soon made their working face a 1,000-ton one.

[Answer] Very valuable experience! One always wins one's case when the leader is able to rely on the creative energy and mastery of people. As an example of this we can use the work of N. Drizhdo, since whose advent as the general director of the Karagandaugol' association the collective has gradually been catching up. The experience of such directors, section chiefs and crew leaders must become the property of everyone, including through the branch system for improving the qualifications of specialists and the progressive experience schools at the enterprises. It is really no secret that the average daily production of the crews engaged at complexly mechanized faces is still not increasing, but dropping.

[Question] Low labor productivity probably also had an effect on the branch's not fulfilling the production realization plan in June?

[Answer] Yes, it did have an effect. In June the ministry gave the State more than 1 million tons of coal less than it should have.

True, we cannot hide the fact that the miners, as before, were let down by the railroad workers. In June they gave us almost 40,000 fewer cars than they should have, because of which consumers did not receive 2.7 million tons of fuel. All the same, many reserves are not being used in the coal industry itself. Here is just one example: half of all the associations have not mastered their own production capacities. This means that the branch had a deficit of several million tons of coal. Such a situation was found, in particular, in the Kuzbassugol' All-Union Production Association and in 14 production associations belonging to the Ukrainian SSR's Minugleprom.

The mastery of capacities that have been introduced requires the rational use of technology, high engineering organization of the production process, and more active introduction of the best experience. Some leaders, it must be confessed, are timid in supporting their crews, who are struggling to dig 500-1,000 tons of coal per day: all of a sudden, say, "geology" lets them down and the plan is threatened. However, these too "cautious" managers need to learn something: in the final account, success in this matter depends on the people and their responsibility, skill and attitude toward business. It is important to strengthen everyone's interest in the best results for a collective's labor. The achievements of the 1,000-ton crews are a reliable and obligatory reference point for us.

11746
CSO: 1822/341

DONETSKSHAKHSTROY DIRECTOR DISCUSSES MINING PROBLEMS

Moscow EKONOMICHESKAYA GAZETA in Russian No 25, Jun 83 p 15

[Article by Nikolay Stepanovich Burego, director, Donetskshakhstroy combine: "When Projects Grow...Into the Depths"]

> [Text] The Donetskshakhstroy combine, which is the largest construction organization in the Ukrainian coal industry, is making a weighty contribution to that branch's development and strengthening. Nikolay Stepanovich Burego, the combine's director, discusses the problems facing mine builders.
>
> After graduation from the Dnepropetrovsk Mining Institute in 1956, N. Burego worked as a section chief, chief engineer of the mine-building administration and chief engineer of the combine. Since 1976 he has been the director of the Donetskshakhstroy combine.

The desire of any mine builder--and I know this from my own experience--is to work where a new coal-extraction enterprise is being created. That is where the action is! There, everything depends on us alone and our ability to organize the work so as to do it on schedule or--even better--ahead of schedule and with high quality indicators. And it is not necessary to "lock horns" with the operating personnel and, along with them, rack one's brain over, for example, how to use the shaft elevators without interfering with each other.

In this respect, some of the Donetskshakhstroy combine's subunits were simply lucky: we have new mines under construction. They are the second stage of the Komsomolets Donbassa and the Shakhterskaya-Glubokaya, the Yuzhno-Donbasskaya No 3 and the Krasnoarmeyskaya-Zapadnaya. In all, they should provide an increase in capacity of 6.3 million tons of coal per year. First, however, our combine's workers and specialists must contribute a large amount of diligent labor and complete a huge amount of construction, installation and mining work. They are doing this with willingness and enthusiasm: the attitude of mine builders toward new construction projects is, as I have already said, respectful. Here, nothing and no one keeps the specialists from showing their capabilities and the workers from exhibiting, as they say, class in their work. However, this imposes on everyone a high degree of responsibility: in case of a stoppage, one doesn't plead "objective causes"--obstacles "imposed" on an operating mine

by the operators. However, our main concern is the modernization and re-equipping of mines.

It goes without saying that not everyone gets to build new enterprises. The Donbass [Donets Coal Basin] is an old coal basin where, in general, there are no unworked coal fields and those who would look for coal have to do so most often in new levels of mines that have already been "occupied" for a long time. In connection with this, it is first necessary to improve the ventilation of workings and, consequently, build additional ventilation and air feed shafts, install ventilators, surface complexes and cooling units and so on.

And all of this must be done so as not to interrupt the work of the miners who are digging out the "solar rock."

Monitoring Cutting Faces

For both new construction and modernization, one of the important indicators that characterizes the labor of mine builders and their hopes for a good final result is the cutting rate. During the last five-year plant our collective worked on 26 shafts, of which 20 were finished. Their total length was 14.3 kilometers.

During this five-year plan our task is to open up and cut 49 vertical shafts and "dig into the depths" a total length of 36 kilometers. Given the previous rates, the number of cutters would have to be doubled in order to achieve this. That way, however, we would not fulfill the conditions for intensification of production.

In choosing the most effective ways of solving this problem, we decided on a clearcut program of operations and outlined practical measures that will enable us to increase the rate of our cutting of vertical shafts during the years of this five-year plan. In connection with this, we determined what we can do ourselves and how we can be helped by the cooperation of our neighbors: designers, machine builders, creators of mining technology and scientific workers.

So, what do we need to do ourselves?

First of all, we need to introduce and master new technology. In particular, we are placing large hopes on the SK-Iu combine, which passed its industrial tests at the Mine imeni Kalinin. During the cutting of elevator shafts in separate months, it gave us record productivity figures. This remarkable machine does all the cutting operations at the face, including timbering. What is especially valuable is that although eight people used to be needed at the face, now only three or four are required when this machine is used. During this five-year plan, four new combines will be operating in our shafts.

The cutters of horizontal shafts will also receive new production equipment. At the Mine imeni Stakhanov in Krasnoarmeysk, right now we, together with Dongiprouglemash [probably Donbass Planning, Design and Experimental Institute of Coal Machinery Manufacture] and DonUGI [Donets Scientific Research Institute

of Coal], are conducting industrial tests of and learning how to use the Soyuz-19 cutting machine, which is manufactured at a plant in Yasinovatovo and is designed to work particularly hard rock.

The 2PNB-2 rock-loading machine has given a good account of itself. It is gratifying that the machine builders in Kopeysk, in the Southern Urals, continued to improve it. Right now a new modification of this machine, on caterpillar tracks, is being introduced.

As we see, there is some very good, highly productive equipment available. According to our calculations, its use will make it possible to increase the rate of shaft-cutting by 20 percent. For the sake of comparison I will point out that during the 10th Five-Year Plan we improved this indicator by 3.6 percent.

We might even be able to do better, but we are being held back by the fact that the problems involved in getting the new equipment to the mine faces are being solved slowly. The tunnelers wait impatiently for each new machine, but the machine builders do not always move quickly enough. And in actuality they, too, work for USSR Minugleprom [Ministry of the Coal Industry]. The people at the branch headquarters should obviously pay some attention to this matter.

The Large Role of Minor Mechanization

Our combine does not survive only by cutting shafts and by using one small but powerful area of mining technology. Our trusts, administrations and construction industry plants have at their disposal a vast, well-developed economy and do all kinds of construction, installation and other mining work.

We produce metal designs and carpentry goods, make semi-finished goods for sanitary and electric engineering projects, make concrete and mortar, produce reinforced concrete goods--in a word, everything necessary for the implementation of our production program. And it needs to be said here that in recent years the combine has been working steadily and dealing confidently with the assignments in the State plan. But along with the increase in labor productivity, things are clearly not going well with us. Why is this?

To be self-critical, we must recognize that first we must address ourselves, the leaders. As always, inertia and the habit of working unstably and by the old ways are hindering us.

When we addressed this troublesome question in earnest, we found that the chief engineers of our construction adminstration and trusts have recently been turned into deputies "for all questions." They occupy themselves with supply, and scrap metal, and motor vehicle transport. They simply have no time for the engineering development of technical documentation, for studying and introducing progressive technology, machinery and mechanisms, for the problems involved in organizing the integrated mechanization of construction processes and the introduction of minor mechanization facilities. Those are the key questions, on the timely solution of which depends an increase in labor productivity, but they remain on the back burner. But, really, there are no miracles, and mine shafts do not dig themselves.

How do we overcome the inertia? And, maybe, at first it's not necessary to overcome it, but direct it into the right channels? Since our chief engineers are used to working under "fluid" conditions, and sometimes that is even more convenient for them, then let it continue to "eat" at them. Only let it be current matters and current concerns related primarily to increasing labor productivity. The main thing is to begin! We believe that this will unavoidably lead to deeper and more promising questions and bring the engineering services to the problems of scientific and technical progress.

In the circle of "current" primary problems, we included a simple assignment: to provide every construction crew with lifting machinery. As we see, the problem is a totally specific one. You don't do it--you answer for it. So, turn earnestly toward progress, engineers.

Some of the planned measures will require greater efforts and more time, and the most important ones are of a long-term nature. In particular, we have planned to reduce to a minimum the so-called "wet," or most labor-intensive processes and to introduce containerization of all piece goods delivered to construction sites. Where it is impossible to avoid doing plastering work and painting, as well as carpentry and facing and brick work, it has been decided to introduce standard sets.

It is very important to equip the workers with minor mechanization facilities, such as electrified tools and equipment. We still do not have enough of them, particularly in the mines. In mine construction we have a great need for light winches and special devices that are small and can carry large end loads. We need them for installation work in sloping shafts. By the way, such devices are needed not only for working in mines, but would also be very useful "on the surface," particularly on renovation projects, where the work is done under crowded conditions.

We are persistent in asking the branch institutes that are concerned with mechanization about these matters, but we're not having any success. The tunneler's job is still a very difficult one, and here is where scientific people, designers, and even our innovators should apply their efforts and knowledge.

Concern About Quality

As a rule, we hand over projects with high ratings. In 1982, the State Commissions accepted 92 percent of our shafts with "good" and "excellent" ratings. And the Makeyevshakhstroy, Krasnoarmeyskshakhstroy and Donetskshakhtostroy trusts do not turn over a single project with a "satisfactory" rating.

It is a well-known fact that in order to do high-quality work, good materials and qualified performers are needed. We have a lot of workers and engineers who are capable of doing any work on the very highest level and who are worrying about their good name and the honor of their organization. And it's a very bad situation when their capabilities and efforts are reduced to nothing by poor construction materials and worthless designs and goods.

It must be said straight out: we have seen no recent improvements in these matters. Entirely on the contrary: the quality of construction materials

continues to decline. What have they done with good red brick? The brick that the Novogrodovka and Krasnoarmeysk brick plants deliver is not resistant to frost. Low-quality concrete comes in from the Ukrpromshakhtostroykomplekt trust. The Krasnolimanskiy Quarry Administration sends out poor quartz sand.

We, however--the consumers--do not dare not only to fine, but even criticize loudly the brick producers: even now they're sending us only a fraction of what we need. The territorial agencies of Gosstandart [State Committee for Standards], who fine our Stroydetal' plants mercilessly for deviations from the standards, for some reason close their eyes to clearly substandard bricks.

At times we, ourselves, make our own lives difficult. It's hardly necessary to say what kind of carpentry work the Stroydetal' plants do when they are forced to work with green wood! We manage to produce prefabricated reinforced concrete designs, even in a metal mold, with such a rough surface that plastering is required. Mortar for bricklaying is sometimes prepared so that even experienced stonemasons cannot immediately distinguish it from concrete, since there is so much gravel in it.

We are now implementing the most energetic measures in order to rectify the situation. Public organizations are playing an inestimable role in our collective's battle against mismanagement, in strengthening labor and technological discipline, and in improving production efficiency. The administration, on its side, is striving to create the proper conditions for improving the quality of the work. In particular, in plants that are being renovated we are building efficient drying kilns for wood, repairing equipment, and creating specialized crews of finishers.

An important factor in improving production efficiency and the quality of the work is total prefabrication in combination with progressive technology and a clearcut organization of labor. Last year we succeeded in using this entire complex of measures in projects at the Druzhkovka Machine Building Plant. The complete prefabrication shop was built, out of light, modern designs, by autonomously financed crews in record time and with a record output that was seven times (!) normal. This example helps aim the trusts' engineering services toward careful preparation for production, the introduction of crew-type organization of labor, an improvement in the level of construction industrialization, and the introduction of progressive experience and scientific and technical achievements.

The combine's collective has fulfilled its 5-month plan for construction and installation work and increased its volume by 5.4 percent in comparison with the same period last year.

11746
CSO: 1822/341

FEASIBILITY OF EXPLOITING TURGAY BASIN DISCUSSED

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 10, Oct 83 pp 30-32

[Article by B. Rakishev, corresponding member of the Kazakh SSR Academy of Sciences, doctor of technical sciences, professor at the Kazakh Polytechnical Institute imeni V. I. Lenin; K. Bekzatov, deputy director of the Chemical and Fuel Industry Section, Kazakh SSR Gosplan; and A. Master, chief of the Department of Fuel-Energy Industry Development of the Scientific Research and Experimental Institute of Planning and Standards of Kazakh SSR Gosplan, candidate of economic sciences: "Strategy for Developing the Turgay Coal Basin"]

[Text] In accordance with the decisions of the 26th CPSU Congress, the growth of the fuel-energy potential of our country in the next decade will be based on opening up production of a considerable part of West Siberian natural gas reserves and inexpensive eastern coals and the further development of nuclear power. In particular, surface-mined coal must serve as a fuel and energy base, not only for adjacent regions, but also areas a significant distance away. This is because eastern coal basins have very large reserves and can serve as raw material bases for many large fuel-consuming enterprises. In addition, these coals are mined by the most inexpensive method--surface mining.

Each fuel-energy complex must be developed differently, according to the specific features of the basin, the quantity and quality of the coal, the geographic position, coal extraction conditions and other factors. For instance, the Ekibastuz coals are "single-purpose" coals used for power generation, while Kansko-Achinski coals are more suitable for producing liquid fuel, semicoke and a number of other products. On the other hand, the transportation of Ekibastuz coals over long distances is possible and economically feasible, while this is not feasible for the Kansko-Achinsk coals.

These features make it necessary to develop a strategy for creating a fuel-energy complex. The most important components of this strategy are: determining the feasibility of developing the basin; determining the first-phase construction projects and their function; establishing construction deadlines and near-term and final tasks for every facility; and determining who will do the work.

In order to solve the first two problems, it is necessary to determine the basin's coal reserves, the distribution and quality of the coals, the economic indices of mining and transportation and the country's economic demand for the coal. The other two problems require an evaluation of the conditions and possibilities of fulfilling the tasks and the calculation of necessary resources and the work sequence. We will consider these factors in discussing the significance of the Turgay Brown-Coal Basin.

Coal Reserves

According to geological data, the Turgay Basin includes 23 deposits and a number of promising structures. There are six coal fields, grouped by their structural geologic features and location: the Ubagansk, Kustanay, Karashilik, Priishimsk, Baikonur and Turgay. The first three are in Kustanay Oblast, while the others are in Turgay Oblast.

Total coal reserves in the basin (up to a depth of 600 meters) are estimated to be over 50 billion tons. Most of the coal is at a depth of less than 300 meters and can be developed by the most progressive and inexpensive method--surface mining.

The Turgay Basin is the largest such basin in the country from its western border to the eastern part of Western Siberia. Around 80 percent of the basin's reserves is economically recoverable, quality coals. They meet all the requirements for ash content, seam thickness and overburden volume.

It is true, though, that only about 10 to 12 percent of the basin has been explored. The Ubagansk field has been studied the most, while the Priishimsk field is the least studied. Nevertheless, the known reserves of industrial-grade coal would make it possible to begin open-pit production of about 130 million tons per year. Ninety-five million tons of this would come from Ubagansk and 35 million tons from Priishmsk. In the Ubagansk field, two large deposits--Kushmurunsk and Eginsaysk--and the small Priozernoye are almost completely ready for development. In the Priishmsk coal field, only the Orlovsk and two other parts of the Kyzyltal'sk deposit have been explored in detail. Prospecting work is continuing.

Geographic Position

In examining this factor, two aspects must be singled out: interregional and intraregional. Based on the former, the location of the Turgay Basin in northwest Kazakhstan is very favorable for supplying power-generating fuel to the industrial enterprises of West Kazakhstan, the southern Urals and the south-eastern part of the Volga economic regions. These areas do not have sufficient resources of their own. Therefore, the Turgay Basin is 600 km closer to the South Urals than Kansko-Achinsk. If the cost of coal transport by railroad is 0.4 kopecks per ton/km, then the cost of transporting coal to the South Urals is 2.4, 4.8 and 6 rubles per ton, respectively. The efficiency is similar for transmitting a.c. or d.c. electricity.

The Turgay's favorable geographic position also stems from the fact that substantial help from the energy-consuming regions can be provided in the form of skilled labor and technical and construction capacity which are available after other deposits have been worked out. Another point to be considered is the favorable geographic, climatic and natural resource conditions which make it easier to hold workers. This has been confirmed by the start-up of large projects such as the Sokolovska-Sarbaysk and the Lisakovsk mining and milling combines.

However, one difference must be noted in the geographic position of the two most promising coal fields--the Ubagansk and the Priishimsk--which are 200-250 km apart. The former is close to the railroad and in a more developed region, which includes the Kushumrun industrial settlement, while the latter does not have these advantages.

The intraregional arrangement of the basin also requires the creation of a construction base and some industrial facilities for each coal field.

Coal Quality

The deposits of the Turgay Basin are typical average-grade brown coals (grade B_2). There is very little difference between the different deposits in terms of moisture content, ash content, ash fusing temperature, volatiles, carbon content and heat content. They are practically equivalent.

Sulfur content and salinity are another matter. Here there are great differences between the deposits. To a great degree, these qualities determine the order and schedule of development, the technology and, finally, the economics of production.

The sulfur content of Lower Jurassic coals, mainly from the Kushumrun and Egisay fields, is on average twice as high as that of Middle Jurassic coals (particularly the Kyzyltal'sk coals). The sulfur content of Kushumrun coals varies from 0.2-10 percent, average 2.9 percent. Engisay coals range from 0.63-4.63 percent, averaging 2.34 percent. A negative factor is that the coals of highest sulfur content are found in the thickest and easiest-to-mine seams.

In contrast to the above deposits, two others slated for phase-one development (the Orlovskoye and Priozernoye) have a much lower sulfur content of 1.0-1.2 percent. No additional environmental protection measures would need to be taken when burning these coals, while the high-sulfur coals will require special power-plant pollution control equipment.

With regard to salinity and alkali content (mainly sodium oxide) of the Turgay coals, the picture is much the same. This property has not been studied in detail until very recently. Such coals have not previously been used by domestic industries.

The All-Union Heat Engineering Institute studied the Turgay coals on the basis of all criteria used world-wide and developed its "salinity" criterion. This stipulates that the content of extracted sodium oxide in hot water must not exceed 0.3 percent. In particular, the study of the Orlovsk coals showed their suitability for combustion without the need for any special equipment.

Significant research has been done on the technological properties of these coals. Thus, the Kazakh Scientific Research Institute for Power Engineering has proved that the Turgay coals can be used in pulverized coal and stoker-fired units. The All-Union Heat Engineering Institute has shown that the coals can be gassified in standard fixed-bed gas generators. The Chemical and Metallurgical Institute of the KaSSR Academy of Sciences and the Ural Polytechnic Institute have shown the fitness of these coals for semicoking, giving a yield of 72-77 percent semicoke and 5-9 percent tar. The semicoke can be used as a reducing agent in ferroalloy production, while the tar can be used in the chemical industry. The Fuel Resources Institute in Moscow has proved that the Turgay coals can be used to produce liquid fuel by the destructive hydrogenation process.

Economics of Mining

The economics of mining the Orlovsk and Priozernoye deposits has been calculated in detail by Uralgiproshakht Institute and the Central Scientific Research Institute of Coal Economics. According to their data, coal production costs per ton are 2.98 and 3.92 rubles, respectively; worker productivity is 833 and 594 tons per month; and the adjusted expenditures per ton of standard fuel are 14.5 and 26.4 rubles. Comparable data for the Maykubensk and Borlinsk mines, which have seam thicknesses similar to the above mines, are: cost, 2.25 and 4.69 rubles; labor productivity, 802 and 474 tons; and adjusted expenditures, 14.9 and 23.5 rubles. The nationwide average indices for surface-mined coal for cost per ton and worker productivity in 1980 were 3.43 rubles and 455.5 tons, respectively. It must also be noted that the level of adjusted expenditures for the Orlovsk mine was only 16 percent greater than that of the most efficient mines in the Kansko-Achinsk Basin. If transportation costs are included in this index, then the Orlovsk mine is not inferior to them.

The calculations of the Scientific Research and Experimental Institute of Planning and Standards of KaSSR Gosplan show that 20-25 million tons of Turgay coal will be required up until the end of the next decade, including 15-20 million tons for pulverized-coal firing and 5 million tons for stoker firing.

Another one of the strategic problems of developing the basin is determining construction schedules. For this, it is especially important to ascertain and account for the fulfillment of preparatory work. It is well known that in the coal industry such undertakings require large construction volumes and long construction periods. Therefore, any miscalculations or omissions are intolerable.

Unfortunately, it must be stated that mistakes have been made in the preplanning and design-study stages of the Turgay Basin development. For instance, only the mine pits are shown on the list of construction projects for the first phase. The list makes no mention of other production structures, social, cultural or personal service facilities. Schedules for preparatory work have not been very accurately determined.

Let's take, for example, the Orlovsk mine. The basic calculations show that 80-85 million rubles worth of work must be done before its construction begins, of which 70 million rubles is construction-installation work. This will take three or four specialized organizations about five years to complete. However, for some reason design studies indicate that work volumes and schedule deadlines are about half that.

In order to achieve annual production of 15-20 million tons by the end of the prediction period, preparatory work must begin in the middle of the 12th Five-Year Plan and mine construction must begin in the first years of the 13th. Then, the second section of the Kyzyltal'sk deposit must be put into production, producing 10 million tons per year. This will make it possible to build two large power stations in the region. Only under these conditions will the even and proportional development of the basin be guaranteed.

The successful completion of the preparatory work will depend on the efforts of the construction organizations. Therefore, specialized subdivisions of the USSR Ministry of Coal Industry and the USSR Ministry of Power and Electrification and a number of other organizations should be brought in.

The following conclusions can be made:

1. Development of the Turgay coals depends on the demand for them in the economy; the presence of large, sufficiently proven reserves; the efficiency of their development; and the very favorable transport-economic position of the region.

2. The technological properties of the basin's coals make possible a wide range of end products. Therefore, it is necessary to organize test-production facilities, particularly for semicoke, coal briquettes and liquid fuel.

3. Of primary importance for power-generation needs is the Kyzyltal'sk deposit, which has the required reserves and quality. Preparatory work must start here in the middle of the 12th Five-Year Plan.

4. The qualities of the Priozernoye coals indicate that future test and industrial work on their physico-chemical processing is needed. On the basis of that work, suitable enterprises, particularly for coal briquette production, must be created.

5. The end result of work done during the period under consideration must be to put the next section of the Kyzyltal'sk, as well as the Eginsay deposit, into production. These coals, depending on research results, will be used for combustion or will be refined.

6. In order to evenly and proportionately develop the basin, the size and location of the construction base must be determined as soon as possible. The necessary work volumes must be divided among the main construction organizations.

12595
CSO: 1822/223

KUZBASS MINERS COMPLAIN ABOUT EQUIPMENT

Moscow SOVETSKAYA ROSSIYA in Russian 6 Jul 83 p 3

[Editorial: "They Brushed Aside the Claims"]

[Text] We have here a stack of readers' letters that are responses to a leading article. "The problems raised by your newspaper are painful ones that disturb every miner in our city," writes N. Nikonov from Mezhdurechensk. Other authors also have the same opinion: A. Bessonov and N. Kut'in from Novokuznetsk, V. Parshin from Leninsk-Kuznetskiy...

The Moscow Region Scientific Research, Planning and Design Institute (PNIUI) of the USSR Ministry of the Coal Industry sent a reply to the editors. In it, in particular, it says that the critical remarks aimed at PNIUI in the article "Machines for the Kuzbass [Kuznetsk Coal Basin]" must be admitted to be basically correct. At the same time, a number of situations that require explanation should be mentioned. Despite isolated shortcomings, the 2UKP complex developed by the institute made it possible, from the very first months of its use and under the most difficult conditions, to insure the extraction of coal at the level of 2,000-3,000 tons per day. In view of its clearcut advantages, this complex was aceepted for series production. However, the time allowed for the elimination of the defects that were discovered was extremely short. The institute is searching constantly for new solutions aimed at improving productivity, reliability and safety: together with the Kargormash association, it has developed an improved equalizing mechanism that was included in the design of Complex No 6 and sent to a mine, created new types of bucket lips and reliable equipment and so on. The institute has given and is continuing to give the mines in the Kuznetsk basin comprehensive scientific and technical assistance in connection with the introduction of these machines. The effectiveness of the utilization of the 2UKP complex is indicated by their high and stable load: from 650,000 to 1 million tons from a single drift. The overall economic effect at the Raspadskaya mine alone is about 5 million rubles.

At the editors' request, V.D. Yalevskiy, general director of the Yuzhkuzbassugol' [expansion unknown], comments on the replay received from PNIUI:

"The institute's leaders report that the criticism is recognized to be correct and that the article has been discussed in the scientific and technical

councils. It would seem that everything is all right. But then came the numbers of the All-Union records established for the complexes developed by PNIUI. How, we say, can there be such claims for these machines! Really, no one is belittling the designers' services, because the complexes actually can do a lot of work. Nevertheless, the flamboyant tone of the reply is not entirely accurate. Before they set any records, the machines wound up in our mine's machine shop for alterations.

"If we calculate the money turned over for the 'modernization' of this new equipment, it will prove to be excessive. It is sufficient to say that practically every element of the combines and accompanying equipment is undergoing basic alteration. However, the essence of the matter is not specific design defects, because no one is free from error. The tone of the article was about something else: the miners have found technical solutions. However, the scientific and technical institutes are in no hurry to introduce them. The plant design offices that have been called upon to solve the problems involved in improving the new equipment on an operational basis prefer to occupy a neutral position.

"PNIUI's leaders write in their reply that the changes made in the machine at the Raspadskaya mine were not effective. I do not agree. When "eyeball" alterations were made with "in-house" facilities, what was desired was probably not always achieved. However, those same changes made under plant conditions made it possible to increase the machines' output considerably."

Our own correspondent for Kemerovo and Tomsk oblasts, V. Dolmatov, comments on the Ministry of the Coal Industry's reply to our newspaper's article:

"They agree in the ministry: series-produced complexes are not suitable for operation under the complex geological and mining conditions of the Kuzbass. In the reply it is stated that the Druzhkovka Machine Building Plant was given the assignment of manufacturing experimental prototypes of machines on a new technical level. After testing, the question of their production at the Kiselev Machine Building Plant in Kemerovo Oblast will be discussed. This, however, remains for the future. For the time being, the branch's leaders see a partial solution to the problem in the creation of specialized sections with company technical servicing of the mining equipment. Such a subunit has been set up by the Kopeysk Machine Building Plant. Its example will soon be followed by the Kargormash association.

"Their intention is this: by participating in the operation of the complexes, the machine builders will be able to influence the plant program on an operational basis, without any interdepartmental agreements, and determine the most vulnerable elements so as to be able to improve them in the design sections of the plant shops. Does this type of cooperation actually exist? Here is what M. Golubkin, chief mechanic at the Mine imeni V.I. Lenin, says:
"'For several years the section's representatives have been gathering information from us about the combines' defects. So what? On the whole, the machine is a good one, but its realization is worse than bad. Even the spare parts are no good. Using any pretext, the plant tries to back off from its claims.'

"Nor could the Yuzhkuzbassugol' association's chief mechanic, P. Tyutyunnik, give an example of effective assistance to the miners by the plant people. The specialized sections do not have complete staffs, and the qualifications of their workers are frequently lower than those of the workers at the coal-mining enterprises. It must be said: the idea of company technical servicing has not yet become a useful practice."

1I746
CSO: 1822/341

GREATER AUTOMATION IN MINING OPERATIONS NEEDED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Jun 83 p 1

[Article by V. Zakharchenko, Donetsk: "Automation in the Mine"]

[Text] As far as saturation with machinery and the power-worker ratio are concerned, the working face in a modern coal mine is in as good a shape as a section of a large plant. However, there is one essential difference between plant and mine equipment. Under the earth there are no machines (with the exception of ventilation installations) that operate in place--they are all in motion. The working face moves forward at a rate of 1.5-2.5 meters per day. It is followed by a whole complex of equipment: a coal combine, conveyor chutes, mechanized timbering units. In addition, the working conditions at the face are not as comfortable as in plant buildings; otherwise, a mine would not be a mine.

One thing that is the same, however, is that one must worry about keeping people away from machinery that is in operation. This is made possible by the extensive use of telemechanics, which controls machines at a distance. In principle this is no problem for modern technology, but in a mine there arise complications that are unique. In the first place, cables are damaged frequently; in the second, every unnecessary cable at the face means unnecessary inconvenience. The future here undoubtedly belongs to wireless control channels, including radio.

The LIRA equipment, which was developed by specialists at the Avtomatgormash [expansion unknown] institute in Donetsk, under the leadership of Laboratory Chief M. Borodin, is now being used industrially. During this five-year plan, the miners will receive about 250 sets of this equipment.

The same institute is working on the creation of new equipment for the remote mechanical control of mining machinery that is based on a completely new principle. Experimental prototypes based on infrared radiation have already appeared. The use of this type of radiation to control mining machinery is a new phase in the world of technology. Three patents have already been issued during the process of development of this method.

V. Kononov, the inventor of the equipment, is holding a small plastic box in his hands. It is the control panel, and the operator wears it on his chest or

on a belt. The panel has an independent power source, which is a set of round storage batteries that are each about the size of a three-kopeck piece. No wires, cords, or antennas--just a few buttons and tumbler switches. On the front face of the panel there are protuberances arranged in two rows of nine each. These are the infrared-radiation light diodes that are the unit's main active elements.

Special, small devices that are photoreceivers are mounted on the mining machinery. They receive the emissions of the light diodes, transform the invisible rays into electrical signals, decode them, and send them to the machines' operating members as commands. The only condition for interaction between the panel and the photoreceivers is line-of-sight visibility, it it is possible to apply that term to radiation.

The operator can be at a distance of up to 15 meters away from the combine, removed from the heaviest accumulations of dust and equipment that is in operation. This face machinery control equipment is impervious to any form of interference, be it electromagnetic, radio frequency or any other type. In addition, it is in no way harmful.

This equipment is the simplest possible, as far as design goes, and as for producibility, it has no peers. Right now, without any special difficulties, an experimental batch of this innovative equipment is being manufactured by the Makeyevka Mining Automation Plan, which until now had never come into contact with any similar items. Another attractive feature is that it is cheaper than other complicated telemechanics equipment.

An experimental prototype of this infrared equipment was first tested under plant conditions, on "neutral ground" at the Skuratovskiy Experimental Plant. Then it was tested under the earth, at the faces of the Makeyevugol' association's Chaykino mine. Standard, series-produced 2K-52 coal-extracing combines, on which the photoreceivers were mounted, was in use there. In 2 weeks, everyone was convinced of the simplicity and effectiveness of this innovation: it not only increases labor productivity, but also guarantees work safety. This, as was emphasized at the June Plenum of the CPSU Central Committee, is of fundamental importance: miners will work under more favorable conditions and obtain greater satisfaction from their work.

Although the first experimental model was tested on an extraction unit, the second one was tested on tunnelers, in the presence of considerable dustiness, at the Donetskugol' association's Trudovskaya mine. Even under these conditions, however, the infrared radiation's operating range reached 20 meters. Nothing out of the ordinary happened: the photoreceivers were mounted on a series-produced GPK-1 tunneling combine, which carried out correctly all the commands sent it from the control panel. More than 20 commands were sent, and with their help it is possible to control practically all mining machinery mechanisms.

In May of this year, the Makeyevka Mining Automation Plant manufactured an experimental series: four complexes of the new mining machinery control equipment. From the results of their testing, the miners and producer will make the necessary corrections in this innovative equipment.

11746
CSO: 1822/341

COAL

NEWLY COMPLETED MEDVEZHEYAROVSKAYA MINE STARTS OPERATION

Kiev UGOL' UKRAINY in Russian No 1, Jan 84 pp 1, 47-48

[Article: "New Medvezheyarovskaya Mine Begins Operation"]

[Text] The republic's coal industry has fulfilled one more undertaking. In December 1983 the newly constructed Medvezheyarskaya Mine of the Aleksandriyaugol' Association produced its first coal. The first section of the mine with a capacity of 1.2 million tons of brown coal a year was put into operation. It was constructed according to the plan of Ukrniiproyekta [State Scientific Research and Planning Institute of Coal, Ore, Petroleum and Gas Industries of the Ukrainian SSR]. In the construction process the mine builders had to surmount no small difficulties, connected with the complex mining and geological conditions, the presence of quicksand and considerable inflows of water. The vertical and sloping shafts were driven with rock that was freezing. Due to the strong rock pressure the first clean bottom hole had to be recut.

Of great assistance in accelerating the construction of the mine were the advanced brigades of I.M. Khvorostina and N.V. Popov, who were transferred from the Svetlopol'skaya Mine to carry out the workings at rapid rates. The drift miners of the brigade of A.K. Kokhanov and N.A. Ivanov worked with high productive rates. The Pavlograd drift miners also helped the Alexandrians--for almost a year. The brigade of N. Ya. Matyushin coped with their tasks successfully here.

Simultaneously with the construction of the mine, apartment houses and social-everyday projects were erected. A secondary school, kindergarten, dormitory and polyclinic were built. The Medvezheyarskaya Mine is working out a horizontal bed of brown coal 2-12 meters thick, strongly flooded, as a result of which it was necessary to construct a complicated drying system. The depth of the working is 70-75 meters. The mine area is stripped by vertical and sloping shafts. The plan for preparing the panel system of the working consists of long shafts from 800 to 1200 meters in length.

The preliminary workings are carried out over an area with a section of 8-11 M^2 clear with the aid of the PK-3r drifting combines. Three longwalls were initially prepared, and equipped with 110KP-10 units. The coal is delivered from the workings to the shaft by conveyor belts.

12151

CSO: 1822/202

YATSKIKH, MINING EQUIPMENT SPECIALIST, CELEBRATES 80TH BIRTHDAY

Kiev UGOL' UKRAINY in Russian No 1, Jan 84 p 47

[Article: "Valerian Grigor'yevich Yatskikh Celebrates 80th Birthday"]

[Text] On 19 January 1984 it will be the 80th birthday of Valerian Grigor'yevich Yatskikh -- doctor of technical sciences, professor, head of the Mining Machinery and Mining Production Equipment Department at the Stakhanov branch of the Kommunarsk Mining and Smelting Institute (KGMI), and one of the initiators and eminent specialists in the field of mechanizing coal extraction in the mines of the Donets Basin. V.G. Yatskikh devoted 60 years of fruitful labor to the coal industry, traversing the path from worker to professor. He began his work biography at shaft No 12 of the Bryansk Mine (today the Mine imeni Dzerzhinskiy Association of Stakhanovugol') as an assistant machinist for a drilling machine. In 1927 he graduated from the Dnepropetrovskiy Mining Institute, where he was directed on the authorization of the Kadiyevskiy raykom of the coal miners union. V.G. Yatskikh devoted all his further activity to the cause of mechanizing the mines of the Donbass and preparing highly-skilled specialists for the coal industry. He worked as the chief of mechanization and mining work for Mine No 8/9 of the Bokovskiy Mine Administration and chief of mechanization of the Snezhnyansk Mine Administration, Trust and Combine of Donbassugol'.

In 1934 V.G. Yatskikh was posted to the Gorlovskiy Machine Plant imeni Kirov, where he headed the division of cutter machines and established a close connection with the machine operators of the mines. This contributed to improving the quality of the cutters and the creation of a new domestic cutter, GTK-3m, later to be in mass use in mines. For 5 years V.G. Yatskikh did scientific research work at VUGI[All-Union Scientific Research Institute of Coal] and then directed the mechanization laboratory at the Donets Scientific Research Institute of Coal, and since 1964 has headed the department at the Stakhanov branch of KGMI.

V.G. Yatskikh is the author of one of the first Soviet coal-extracting combines of the YaR type, an experimental batch of which was in operation at the Donbass mines in the prewar years; the UKMG combine for thin (0.4-0.6 meters) beds, which were operated in the 50's in Donbass mines; the narrow-intake combine UZK-1. In all, V.G. Yatskikh has 42 authorship certificates for inventions, a large part of which were put into practice by the coal industry.

In the 30's to 50's, when cutting machines at the mines were a basic means of extracting coal, machine operators were made ready in accordance with the textbooks of V.G. Yatskikh. His textbook, "Mining Machines and Complexes" for mining technical schools, has been up-dated and republished five times in the last 25 years. In all, V.G. Yatskikh has published 40 textbooks, training manuals and monographs and 180 articles in mining journals. In coauthorship with Professor M.G. Krapivin and Candidate of Technical Sciences S.I. Vasilenko, the textbook "Mining Machines and Complexes" for mining VUZ's has been prepared for press.

V.G. Yatskikh and the collective of the department that he heads also give great assistance to production workers in the field of improving and raising the efficiency of narrow-intake extraction of coal. V.G. Yatskikh heads the primary organization of NTGO [Scientific and Technical Mining Society] and has been awarded five government medals, badges for "Miner's Honor", grades 2 and 3, and many departmental awards.

We congratulate the jubilarian and wish him sound health and further creative achievement.

12151
CSO: 1822/202

NEW COAL MINING MACHINE IN USE AT KARAGANDA

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian
No 9, Sep 83 pp 51-52

[Article by I. Ispayev, candidate of technical sciences; V. Litvinov, Zh. Dikambayev and A. Filatov, staff members of the Karaganda Coal Research Institute: "New Machine in the Karaganda Mines"]

[Text] The difficult geological and mining conditions caused by the dipping seams of the Karaganda Coal Basin prevent the universal use of mechanized coal mining systems.

The KM-130, 2UKP, OKP-70 and MK-75 mining machines are now in series production. These are designed for more difficult operating conditions. This article concerns the MK-75 machine.

The MK-75 was first used in 1980 by the Karagandaugol' Association at the Tentekskaya Mine in the T_1 seam. The seam thickness varies from 1.5-1.65 meters, with a dip of 20-32 degrees. It is overlain by fractured, unstable argillite containing layers and lenses of coal. The argillite is overlain by solid fine-and coarse-grained sandstone up to 17 meters thick.

In 1980-1981, the MK-75 machines were used to work four longwalls. They performed better than a KM-87DN machine operating under the same conditions. Here are the comparative technical and economic indices of their operation (see table 1).

Table 1.

(1) Наименование лав	(2) Длина лав, м	(3) Угол падения, градус	(4) Среднесуточная нагрузка за период работы, т	(5) Максимальная среднесуточная нагрузка, т	(6) Производительность труда рабочего, т
(8) (7) Лавы, оборудованные комплексом МК-75					
(9) 211-С	73	29	914	1156	10,4
(10) 311-Ю	120	23	757	1025	8,8
(11) 121-Ю	120	24	689	1014	13,4
143-Ю	110	23	1143	2165	22,4
(12) Лавы, оборудованные комплексом КМ-87ДН					
(13) 731-С	145	19	584	922	12,1
(14) 511-Ю	137	24	335	502	9,1
(15) 321-С	142	22	446	864	10,3

Key:

1. Longwall number
2. Longwall length, meters
3. Dip, degrees
4. Average daily output over the working period, tons
5. Maximum daily output, tons
6. Worker productivity, tons
7. Longwalls worked by the MK-75 machine
8. 211-S
9. 311-Yu
10. 121-Yu
11. 143-Yu
12. Longwalls worked by the KM-87DN machine
13. 731-S
14. 511-Yu
15. 321-S

An analysis of the data given in the table shows that the average daily output and worker productivity were higher for the MK-75 than for the KM-87DN. On this basis, it was recommended for testing under more difficult geological and mining conditions.

Until 1981, the Toparsk-aya Mine was the only one that did not have mechanized coal mining. It has steeply dipping seams (over 30 degrees), weak sidewall rock, an uneven horizontal contour and significant flooding problems. Coal removal was done with explosives or picks; timbers were used for roof support. Average daily output did not exceed 240 tons; the coal production cost reached 4.5 rubles per ton.

There were several attempts at using various mechanized mining equipment. For instance, the KM-87DN machine was tested here in 1969, without success. The staffs of the Karagandaugol' Association and the All-Union Scientific Research and Planning Design Institute for Coal decided to introduce the MK-75 machine on the second east longwall of the K_{11} seam.

K_{11} is a complex seam consisting of two to three coal members separated by argillite layers of medium strength. Seam thickness ranges from 1.2 to 1.85 meters. It is directly overlain by a dark-gray, fractured, unstable argillite. Above that are layered, compact aleurolites of medium strength and stability.

The MK-75 machine consists of a mechanized roof support, an IGSh-68 shearer-loader, an SUMK-75 scraper conveyer with a cable-layer, a T6M interlocking roof support, two SNU5 pump stations, a standard feeder system, an ILP safety winch and a PTK drift conveyor.

The coal face operation consists of four shifts: three mining shifts and one repair and preparation shift. Each shift consists of 11 people. The shearer-loader operates in one direction. The longwall cycle begins with the removal of a 0.5 meter-wide strip of coal as the cutter moves forward. Mucking is done simultaneously. The next cut is begun by sideways approaches. The machine sections are straightened with the ILP winch, mounted in the ventilation drift.

Less than a month after start-up, the second eastern longwall of the K_{11} seam was brought up to rated output. The economic gain from the introduction of the machine was 239,400 rubles.

Table 2 gives the technical and economic coal production indices for the drilling-and-blasting method and the MK-75 machine.

Table 2.

(1) Показатели	(2) Выемка буровзрывным способом	(3) Выемка комплексом МК-75
(4) Мощность пласта, м	1,7	1,7
(5) Угол его падения, градус	28	28
(6) Длина лавы, м	100	76
(7) Среднесуточная нагрузка, т	235	538
(8) Производительность труда рабочего, т	7	10
(9) Численность рабочих в смену	9	(15) 11
(10) Система разработки	Длинные столбы по простиранию	
(11) Количество циклов в сутки	0,32	5
(12) Ширина захвата, м	1,5	0,5
(13) Подвигание очистного забоя, м/сут	0,5	2,5
(14) Себестоимость добытого угля, руб/т	4,5	3,1

Key:

1. Indices
2. Drilling-and-blasting method
3. MK-75 machine
4. Seam width, meters
5. Dip, degrees
6. Longwall length, meters
7. Average daily output, tons
8. Worker productivity, tons
9. Number of workers per shift
10. Mining system
11. No. of cycles per day
12. Width of cut, meters
13. Working face advance, meters per day
14. Production cost of coal, rubles per ton
15. Long pillar along the strike

As can be seen, the MK-75 machine had greater output, almost completely eliminated manual labor and made the working conditions considerably safer.

The basic aim of this experiment was to check the possibility of using the MK-75 in the Toparsk-aya Mine. Therefore, we note that the relatively low daily output of the machine does not represent its maximum output. This was not the intention of the test.

Besides, the task at this time was not to run the machine at its maximum output, but to introduce it to the miners. After working out the second

eastern longwall, it was transferred to the lower sub-level. Its average daily output is already 580 tons.

Therefore, the test operation of the MK-75 machine in the Tentekskaya and Toparskaya mines has shown that it can be used successfully to mine dipping coal seams under difficult mining and geological conditions. This is its future significance for the entire Karaganda Basin.

12595
CSO: 1822/223

SYNOPSES OF ARTICLES IN UGOL' UKRAINY, NO 1, JANUARY 1984

Kiev UGOL' UKRAINY in Russian No 1, Jan 84 pp 47-48

UDC 622.232.75 "Donbassantratsit"

PLANNING EXTRACTION OF COAL IN DONBASSANTRATSIT ASSOCIATION

[Synopsis of article by B.I. Akol'zin, pp 3-5]

[Text] Technical systems for using planing units UST-2m, and CO-75 in the Donbassantratsit Association mines. 1 table, 2 illustrations.

UDC 622.272.633

WORKING LONGWALLS IN BURST-HAZARDOUS BEDS IN ADVANCE OF THE CONVEYOR DRIFT

[Synopsis of article by K.V. Pevtiyev, M.I. Bol'shinskiy, I.Ye Drobnov and L.A. Ushakova, p 6]

[Text] Excavation of burst-hazardous beds using the continuous system for working 8-15 meters in advance of the conveyor drift in the Mine imeni Kalinin of the Donetskugol' Association. 1 reference.

UDC 622.233/235

INCREASING THE EFFICIENCY OF BVR [NOT FURTHER IDENTIFIED] AT THE MINE IMENI MENZHINSKIY

[Synopsis of article by Ye.M. Gartsuyev, V.F. Ovchinnikov and A.P. Sheboldenko, pp 7-8]

[Text] A new technique for working BVR using a double-stage cut. An experiment in introducing the new technique when carrying out field workings at the Mine imeni Menzhinskiy of the Pervomayskugol' Association. 1 table, 2 illustrations.

UDC 622.232.8.001.86:622.5

WORKING A BED WITH THE MECHANIZED 1KMT COMPLEX UNDER CONDITIONS OF INCREASED WATER FLOW

[Synopsis of article by R.P. Zhuravlev, L.F. Kozhukhov and N.M. Pisarenko, pp 8-9]

[Text] Operation at the Abashevskaya Mine of the Yuzhkuzbassugol' Association of an experimental model of the 1KMT complex with a water flow into the longwall. Measures to draw off the water and purify it before its entry into the header. Recommendations for improving the mechanized support. 1 illustration.

UDC.622.273.217

LEAVING ROCK IN A MINE USING HYDROMECHANIZATION

[Synopsis of article by I.I. Dudenko, V.P. Fedorov and G.V. Maslyayev, pp 10-11]

[Text] Suggestions for using underground feeding bins to feed mine rock into the worked space of the longwall. The results of studies on the testing stand for depositing gobbing strips in a thin gently sloping bed. 1 illustration.

UDC 622.274.526

ANALYSIS OF REINFORCEMENT AND SUPPORT OF VENTILATION AND COAL-CHUTE CUT-THROUGHS IN STEEP BEDS

[Synopsis of article by V.D. Moroz, A.N. Belyaev and I.S. Kostyuk, pp 11-2]

[Text] The results of testing reinforced concrete supports to protect ventilation and coal-chute cut-throughs when coal is extracted with guard units. Wood-shaving packing.

UDC.622.232:551.24

THE EFFECT OF FRACTURING DISLOCATIONS ON THE EFFICIENCY OF CLEARING WORK IN WEAK ROCK

[Synopsis of article by A.V. Shmilgol' and Yu.M. Khalimednik, pp 12-13]

[Text] Analysis of the effect of the amplitude of the dislocation and angle of incidence of the longwall to the crossing line of the displacement with the bed under the conditions of weak wall rock at the mines of the Western Donbass. The volume of rock cut increases sharply when the angle of incidence is reduced from 40 to 0°. 1 Table, 2 illustrations, 1 bibliographical entry.

UDC 622.281.5:622.268.1

METAL SUPPORTS WITH AN INCREASED SUPPORTING CAPACITY AND PLIABILITY FOR PRELIMINARY WORKINGS

[Synopsis of article by I.A. Gorbunov, A.V. Braytsev, B.N. Ol'shanskiy and V.A. Baturintsev, pp 13-14]

[Text] The results of laboratory tests on a vertical test stand at Donug' and production tests at the Pereval'skaya and Belorechenskaya mines of the Voroshilovgradugol' Association. 1 table, 1 illustration.

UDC 622.223.3

SINGLE-HORIZON SYSTEM OF STRIPPING DEEP SHAFTS

[Synopsis of article by M.Sh. Zel'vyanskiy, A.A. Leshchinskiy and L.L. Kaufman, pp 15-16]

[Text] The results of a technical-economic evaluation of the single-horizon block method of stripping deep shafts that does not require deepening the shafts, and of carrying out main drifts according to horizons. 1 illustration.

UDC 622.232:624.138.24

ELIMINATING WATER FLOWS WHEN TUNNELING MINE SHAFTS

[Synopsis of article by N.V. Mamontov and Yu. A. Veselov, pp 16-17]

[Text] Eliminating water flows by using the combined method of plugging when tunneling a mine shaft under complex hydrogeological conditions. Technology of the Krivorozhskiy branch of VNIIOMSHS. 1 illustration.

UDC 622.232.72

SELECTING THE TARGET FUNCTION OF CONTROLLING THE MINE WORKINGS PROCESS

[Synopsis of article by V.D. Potapov, V.A. Reznikov and V.V. Sinenko, pp 17-18]

[Text] Analysis of the aim of controlling the process of breaking up the rock mass and of the special features of systems for controlling mining machines. The target function, which takes into consideration the technical indicators, and also the reliability, tension and safety in the work of the operating personnel. Use of the function in synthizing the control systems and the technical and ergonomic decisions contributing to raising the efficiency of the combine tunneling of the workings. 4 references.

UDC 622.363.2:(658.012.011.56:681.3.06-192)

RELIABILITY OF SOFTWARE FOR AUTOMATED CONTROL OF INDUSTRIAL FLOWS AT MINES

[Synopsis of article by R.T. Franko, K.G. Akutin and A.A. Merkovskiy, pp 19-20]

[Text] Analysis of the object of control, reasons for failure of software and recommendations for setting up reliable software for the ASU TP [automated control system for technical procedures] of a coal mine. 1 illustration.

UDC 622.28.004.5:658.531

ANALYSIS OF THE LABOR INTENSIVENESS AND MEANS TO MECHANIZING MINE REINFORCING

[Synopsis of article by I.N. Bezmen, V.G. Kilimnik and I.I. Yaroshinskiy, pp 21-22]

[Text] Step-by-step structure of the reinforcement process, labor intensiveness of fulfilling the basic and auxiliary operations when reinforcing workings. Means of mechanizing the construction of the support, dividing them with respect to the structural assembly and functional purpose, advantages and disadvantages. 1 table.

UDC 622.012.2:621.316-52

ECONOMIC EFFICIENCY OF CONTROL SYSTEMS AND ANALYSIS OF THE OPERATION OF BREAKAGE STOPES

[Synopsis of article by V.F. Boronin, B.A. Romanov and N.P. Demchenko, pp23-24]

[Text] Information on an automated control system and analysis of the operation of breakage stopes. Economic efficiency in operating the system in the mines, recommendations to increase its efficiency.

UDC 622.678.532.068.08

CHARGING-LOADING UNIT WITH AN INCLINED HOPPER-BATCHER AND WEIGHT BATCHING

[Synopsis of article by A.I. Solomentsev, S.S. Safonov and P.P. Kotok, p 25]

[Text] Acting principle of a charging-loading unit with an inclined hopper-batcher, assembled and tested at the Dolzhanskaya-Kapital'naya Mine of the Sverdlovantratsit Association. 1 illustration.

UDC 622.44:631.563

VO-5 VENTILATOR FOR THE COAL INDUSTRY AND AGRICULTURE

[Synopsis of article by I.A. Raskin, S.K. Ivanov and V.N. Karminskiy, pp 26-27]

[Text] Characteristics, description and results of testing the VO-5 ventilator with a diameter of 500 mm, designed for use at the surface of mines and for drying grain in granaries. Series output of the VO-5 has been opened up since 1982.

UDC 622.625.245(088.8)

PDT-600 PLATFORMS FOR TRANSPORTING LARGE TIMBER TO A MINE

[Synopsis of article by N.S. Kovalenko, A.A. Buzevatyy and S.G. Khvorostyanenko pp 27-28]

[Text] Results of acceptance tests of a type PTD-600 platform at the Mine imeni 19th CPSU Congress of the Voroshilovgradugol' Association. Assembly of the platforms, technical specifications. Merits. 1 illustration.

UDC 622.673.1.004.67

ANALYSIS OF TIME INPUT TO SERVICE AND REPAIR MINE HOISTING UNITS

[Synopsis of article by V.L. Krichevskiy and Z.V. Datsun, p 29]

[Text] Time input to service and repair mine hoisting units depending on their purpose, machine type, number of units in the shaft and its depth. Suggested measures.

UDC 622.673.5

MONITORING THE CABLE TENSION OF MULTI-CABLE HOISTING UNITS

[Synopsis of article by V.I. Berezhinskiy, V.M. Prikhod'ko and A.I. Samorodov, p 30]

[Text] Use of the wave method of measuring stresses in the cables of multi-cable hoisting units, using the automated electronic Unison timing device ensures fulfillment of the PTE requirements with respect to the permissible loads for the cable (margin of error not over ± 5%).

UDC 621.753.1:622.23.05

PRECISION OF ASSEMBLING FUNCTIONAL JOINS AND LIFE OF CLEANING COMBINES

[Synopsis of article by A.A. Chichkan, p 31]

[Text] Joining plunger pairs of hydraulic drive elements. Assembly precision. 1 illustration

UDC 620.179.1:622.233

NONDESTRUCTIVE MONITORING OF EQUIPMENT PARTS FOR DRILLING WELLS IN MINES

[Synopsis of article by I.B. Vaynshteyn and N.M. Revyakin, p 32]

[Text] Efficient techniques for preventive nondestructive monitoring of crucial parts of load-lifting equipment of drilling rigs. Procedures and devices for defectoscopy, increasing the reliability and productivity of the monitoring. 2 illustrations

UDC 625.098.622.23

COMBATING THE NOISE OF MINE-CUTTING EQUIPMENT

[Synopsis of article by L.A. Geshlin, pp 32-33]

[Text] Basic type-sizes of the noisiest mine-cutting equipment and ranges of excesses in the sound level and the most intensive sound sources. Means of reducing the noise and data on the efficiency of the means presented.

UDC 622.817.47

USING WATER-BEARING HORIZONS FOR PREVENTIVE PROCESSING OF COAL-BEARING MASSES

[Synopsis of article by A.Ye. Perezhilov, A.S. Lukash and V.G. Kochetov, pp 33-35]

[Text] Results of using water-bearing horizons for hydro-processing of coal beds through wells drilled from the surface. 1 table, 1 illustration.

UDC 622.445:621.694.2

ESTIMATE OF THE PRODUCTIVITY OF A PNEUMATIC EJECTOR IN WORK USING AN EXHAUST VENTILATION SYSTEM

[Synopsis of article by B.L. Zaslavskiy and A.V. Kulinich, p 35]

[Text] Results of experimental research on determining the aerodynamic parameters of an ejector with a ring nozzle in its operation for a ventilation system. Method of calculating the effect of the system resistence to the air flow.

UDC 622.47

LIGHTING FOR WORKINGS IN THE DONBASS MINES

[Synopsis of article by N.B. Machugovskiy, P.V. Ul'yanov and A.V. Grechka, p 36]

[Text] Lighting in mines, its effect on accidents. Reasons for inefficient use of lighting equipment and ways to improve lighting through efficient servicing of lighting units.

UDC 622.51:628.33/35.002.2

DEEP-CLEANING WATER PLANT AT THE MINE IMENI ARTEM

[Synopsis of article by Ye.V. Grigoryuk, N.V. Kazimirenko and V.I. Makhonchenko, pp 37-38]

[Text] Technique for deep cleaning of mine waters, developed by Donug. Operation of the deep-cleaning water plant at the Mine imeni Artem of the Voroshilovgradugol' Association. 1 illustration

UDC 622.51:628.33/35+622.531.001.2

NEW PRESSURE FILTER FOR PURIFYING MINE WATERS

[Synopsis of article by L.M. Vitrenko and S.F. Sergiyenko, pp 38-39]

[Text] Structure and operation principle of the six-section pressure filter developed by Donug to purify mine waters. Comparative data on the use of pressure and open filters in mine water-purifying units and results of plant tests of the filter. 1 illustration.

UDC 622.831.325.3

WATER SEPARATOR TO INCREASE DEGASIFYING UNIT EFFICIENCY

[Synopsis of article by V.A. Malashkina and I.A. Konoz, p 39]

[Text] A water separator with a special structure, installed at a sectional pipeline and serving a group of wells.

UDC 622.7.002.5:666.3

USING NEW CERAMIC COVERS AT COAL-CONCENTRATING MILLS

[Synopsis of article by V.Ye. Fedorchenko, V.A. Rudenko and A.Ya. Bondarev, p 40]

[Text] Results of testing nonmetallic coverings for coal-concentrating equipment under laboratory and industrial conditions. Advisability of using mullite-corundum covering to protect coal-concentrating equipment from the effect of high temperatures, gaseous and abrasive media. 1 table

UDC 622.648.2:622.234.42.001.5

STUDY OF DESALINIZING COAL IN THE HYDROTRANSPORT PROCESS

[Synopsis of article by A.A. Krut' and Yu.G. Svitlyy, p 41]

[Text] Results of studying the leaching of sodium compounds in the process of hydrotransport of coal. Recommendations. 1 table, 1 reference.

UDC 622.73

PRODUCTIVITY OF DRUM CRUSHERS

[Synopsis of article by A.P. Denisenko, p 42]

[Text] Formula for estimating the productivity of drum crushers and its advantages over empirical relationships.

UDC 622.834.1:622.031.52.001.24

EVALUATION OF THE COMBINED EFFECT ON THE EARTH'S SURFACE IN A SERIES OF GENTLY SLOPING BEDS

[Synopsis of article by S.A. Medyantsev, pp 43-44]

[Text] Probable values of the coefficients for the effect of individual beds on the earth's surface. Coefficient of combined effect of the bed formation. Conclusions and recommendations. 1 table, 3 illustrations.

UDC [624.131.439.4+622.023]:553.94(477.62)

CONNECTION BETWEEN THE TENSILE STRENGTH AND MAXIMUM STRESS WITH COMPRESSION OF ROCK AND COAL

[Synopsis of article by V.L. Sverzhevskiy and V.P. Subbotin, p 45]

[Text] Correlations between the maximum stress, with compression of rock and coal, and the tensile strength. 1 table, 1 illustration, 2 references.

12151
CSO: 1822/202

FIRST USSR SOLAR POWER PLANT TO BEGIN CONSTRUCTION

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 1 Feb 84 p 4

[Article by R. Akhmedov, professor, doctor of technical sciences, first deputy director, G. M. Krzhizhanovskiy Power Engineering Institute]

[Text] The first Soviet experimental solar electric power station (SES-5) should be put into operation in the coming year in the Crimea. In comparison with the giants of modern power production its power is small -- only 5,000 KW. But perhaps it's size that counts? We recall that the world's very first atomic electric power station (AES), constructed in the Soviet Union in 1954, had precisely the same power. And today, one after another, the power blocks of atomic power stations whose unit power has attained a million kilowatts are entering into operation.

The idea of using concentrated solar energy in itself is not new. Already at the end of the last century heat engines had been created which used the energy of steam produced by means of solar radiation. The concentration of solar energy on the surfaces of the steam generator was ensured by means of reflecting mirrors with complex curvilinear parabolic surfaces.

However, such optical systems are so expensive and difficult to fabricate that not only in the past, but also at the present time it is impossible to count on the construction of solar power plants of such a type with a power of more than 50 KW. The expenditures on a precise optical system, with an increase in its size increase in a geometric progression. It is evident that such a route is completely unacceptable.

This technical barrier on the path of development of large-scale solar power production was already overcome in the early 1950's by Soviet scientists. At the G. M. Krzhizhanovskiy Power Engineering Institute specialists have developed a fundamentally new concept of creation of large solar electric power stations of the tower type. Proposals have also been developed for such stations with a power from 1,200 to 2,500 KW.

The essence of this concept is as original as it is simple. Who is is not familiar with the sun "spot" reflected from a flat mirror? And now visualize hundreds of such "spots," merging into a single spot. It is clear that in such a way it is possible to achieve such a multiple concentration of solar radiation as will ensure high-temperature heating of any matter.

This idea has made it possible to dispense with complex curvilinear mirrors and replace them with a system consisting of a great many very simple flat mirror reflectors -- heliostats.

The priority of the USSR in the development of this concept is recognized throughout the world.

Exactly what is the SES-5 which is now under construction? Visualize a tower with a height of 70 m on which is mounted a circular solar steam generator whose height and diameter are 7 m. In concentric circles around the tower there are 1,600 mirror heliostats. By means of an electronic computer the automated control system ensures such a position of each heliostat that the reflected rays, regardless of the position of the sun in the heavens, at each moment in time are directed strictly onto the surface of the steam generator.

In contrast to ordinary electric power stations, the SES-5 will also carry power accumulators in which heated water will be stored at great pressures.

In a case of appearance of cloud cover or if the need arises for electric power after sunset, the vapor from the upper cavity of the accumulators can be directed to a steam turbine.

The number of hours of sunshine in the Crimea makes it possible to ensure a duration of operation of the SES-5 for 1,920 hours per year. During this time the electric power station can produce about 6 million kilowatt-hours of electric power and ensure a savings up to 2,000 tons of conventional fuel. But this is still not the most important point.

The SES-5 is primarily a large, unique scientific center and experimental polygon where it is necessary to carry out a broad program of in situ experimental investigations and accumulate all the necessary information for the future development of effective solar electric power stations with a power of hundreds of thousands of kilowatts. But this problem is by no means simple.

It is necessary to overcome a new barrier -- economic. For the time being the first SES are expensive. For example, the specific expenditures on the construction of an experimental SES at Barstow (United States) amounted to $14,000 per kilowatt of installed capacity. Accordingly, in order to ensure that SES will be competitive with ordinary electric power stations with the present-day prices for fuel it will be necessary to reduce the specific expenditures by at least an order of magnitude. In this connection it is fitting to recall that the specific expenditures on the construction of the first atomic electric power station were excessively great and exceeded by many tens of times the cost of modern atomic power stations.

The search for such technical solutions as would ensure the future development of economically efficient SES is the principal direction in today's scientific research. The already accumulated experience in computational research, technological planning and practical construction of the SES-5 is enabling scientists, on a more fundamental basis, to pose and successfully solve new, more complex problems.

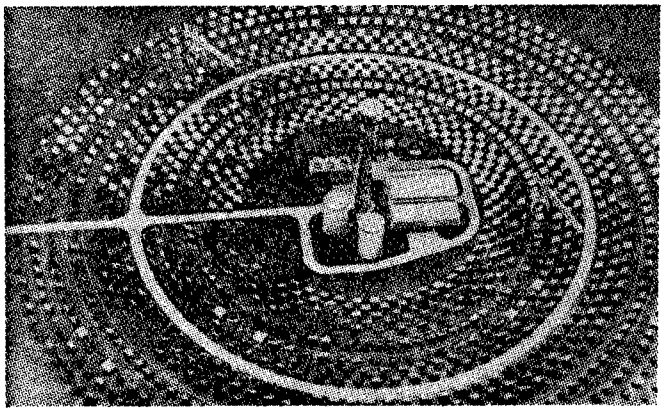


Illustration of SES-5, as described in text.

For example, at the Power Engineering Institute specialists have prepared the technical specifications for establishing a major experimental-industrial combined solar-fuel electric power station (kombinirovannaya solnechno-toplivnoy elektrostantisiya) with a power of 200-300 thousand kilowatts in Uzbekistan. As indicated by the plans, the specific capital investments for such a combined solar-fuel electric power station in comparison with the SES-5 can be reduced by a factor of more than 10 and the cost of the electric power can be reduced by a factor of more than 30.

Progressive and extremely effective schemes for solar-fuel electric power stations with thermochemical transformation of solar energy are being developed.

The first experimental SES in the USSR is becoming the material and technical basis for these investigations.

5303
CSO: 1822/183

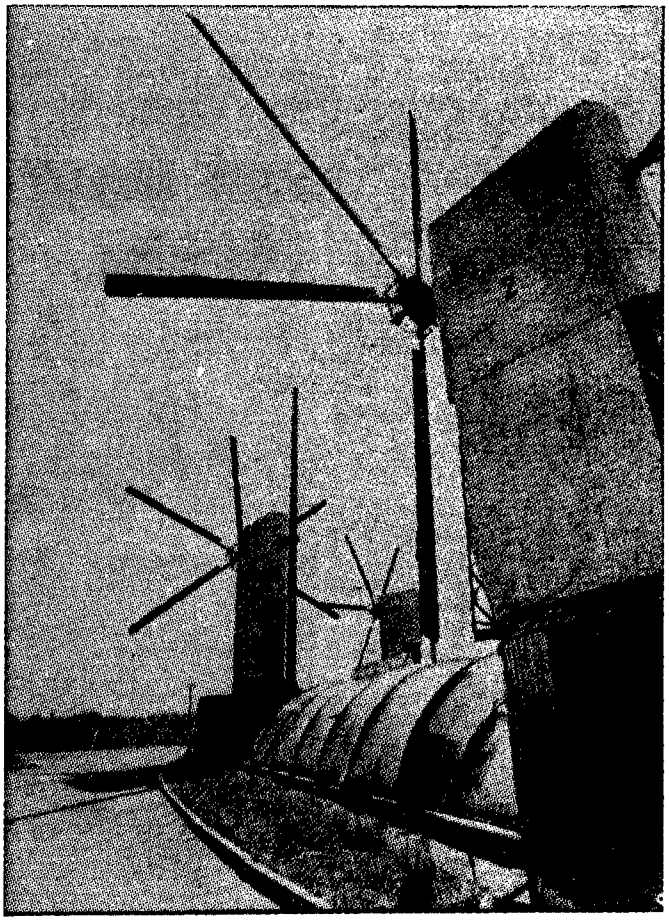
ALTERNATE FUELS

KIEV POLYTECHNIC INSTITUTE RESEARCHES ALTERNATE ENERGY SOURCES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Dec 83 p 4

[Unsigned article]

[Text] The medium which will surround us tomorrow will be dependent on the energy sources which will be used by man. That is why already today, in addition to atomic power stations, scientists are experimenting with ecologically pure energy sources which will place the sun, wind and water in the service of man.



The windmill generators in the photograph were installed in the experimental proving grounds at the Kiev Polytechnic Institute. Here, on the shores of the Desna, Ukrainian scientists are carrying out research on multiple utilization of renewable energy resources. In addition to wind turbines, solar collectors, hothouses, a hydroengineering complex, a station for electric power accumulation and other engineering structures have been erected on the proving ground territory. They are being utilized to find the means for the most rational and effective use of solar, wind and water power in the national economy.

5303
CSO: 1822/183

NUCLEAR POWER PLANT SAFETY DISCUSSED

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 11, Nov 83 pp 67-68

[Article by A. Malenchenko, doctor of medical sciences, laboratory chief of the Nuclear Power Institute, Belorussian SSR Academy of Sciences: "Safe and Reliable Power"]

> [Text] The press reports that construction has begun on a nuclear TETs [heating and power plant] near Minsk. Can you please tell us how safe the operation of nuclear plants is? K. Matusevich, Mar'ina Gorka (Minsk Oblast)

The insufficiency of organic fuel and the necessity of transporting it over considerable distances makes it necessary to expand the power system on the basis of nuclear sources of energy. Specialists predict that nuclear power plant capacity in the world will reach 1030-1650 gigawatts by the year 2000. They will generate 20 to 27 percent of all electricity. The Minsk facility will be the first nuclear plant in Belorussia, a plant with two VVER-1000 [water-moderated] nuclear reactors and four turbogenerators with a capacity of 2 million kilowatts. The nuclear TETs will generate electricity and heat (up to 1,860 gigacalories per year). This will improve Minsk's heat supply, and the closure of unprofitable boiler facilities will reduce amounts of atmospheric pollutants formed when organic fuel is burned.

Nowadays it is difficult to find an industrial sector in which safety matters have been tested as thoroughly and reliably as in nuclear power. Safe and trouble-free nuclear plants are ensured by a system of design-technological and organizational measures. There are several safety barriers provided against possible contamination of the environment by radioactive isotopes. Many years of observations have confirmed the excellent reliability of the apparatuses.

The advantages of the new technology are especially graphic compared with traditional means of generating electricity. Of course, enterprises running on nuclear fuel do exert some impact on the environment due to the excavation for their construction, high water consumption and various wastes. Not one of these factors, however, is specific to nuclear power. They also all occur in power systems run on organic fuel. Incidentally, the amount of land allocated to generate a unit of electricity per year in nuclear power is substantially less than the amount needed for coal-fired plants (20 to 60 hectares per gigawatt vs 100-400).

Heat "pollution" is a very complex problem. Intensive work is being done on projects designed to recycle the heat from nuclear power plants for central heating systems, to supply hot water, and meet the needs of agriculture, metallurgy, and the chemical industry. For example, the Belorussian nuclear plant's central heating unit supplies heat to the industrial site and the residential district.

The generation of electricity using organic fuel involves considerable consumption of oxygen and the emission of an enormous quantity of carbon dioxide into the air. In some of the industrially developed countries, considerably more oxygen is consumed than is formed in the photosynthesis process. Since the start of the industrial revolution, the concentration of carbon dioxide in the atmosphere has increased by 10 to 20 percent and continues to rise at a rate of 0.2 percent annually. Carbon dioxide has strong absorption bands in the infrared range of the spectrum and does not permit thermal radiation of the earth. This results in what is known as the greenhouse effect. A rise in temperature can lead to thawing of the icecaps, a rise in the level of the world ocean, and submersion of many territories. In this context, conversion to nuclear fuel will make it possible to reduce the amount of carbon dioxide entering the atmosphere and the probability of negative consequences of this process.

Thermal power has the dubious honor of leading in the contamination of the environment by various pollutants. In 1979, power plants running on organic fuel produced 27 percent of all pollutants. One 2.4-gigawatt coal-fired thermal power plant releases about 650 to 750 tons of sulfur dioxide and 200 to 250 tons of nitrogen oxides into the atmosphere every day. In areas where large coal-fired thermal power plants are located, they place a heavy burden on the environment. Sulfur dioxide has a serious impact on animal and plant organisms, acidifies lakes and rivers, and increases deterioration of materials. Nitrogen oxides are just as bad. Gas pollutants spread over great distances globally. Around thermal power plants are formed qualitatively new biochemical provinces in which the ratio of trace elements and natural radionuclides is disrupted. An assessment of the biological hazards of radioactive wastes from nuclear plants and thermal power plants indicates that the latter exert a stronger impact on the environment.

The radioactive impact of nuclear power plants on the environment is often exaggerated. Comparative analyses, meantime, have revealed these eloquent facts: radioactive emissions from coal-fired thermal power plants produce greater dosage impacts on the population than those from nuclear plants.

Information collected so far attests to the fact that the biosphere is sufficiently well-protected against the radiation impact of nuclear power installations. This sector is one of the least hazardous of all the familiar means of generating power. Strict regulation of radionuclide emissions into the atmosphere and precise implementation of sanitation and hygienic regulations make it possible to maintain radiation conditions in the vicinity of nuclear power plants at the same level as before the plant was started up.

Nuclear power plant operation experience in the USSR attests to the high level of radiation safety for both personnel and the environment. Regular

monitoring of the environment in a 40-kilometer radius around nuclear power plants has shown that they do not have a significant impact on the amount of radioactive elements in the air, the soil, plants, bodies of water, sediments, and foodstuffs.

Of great importance in ensuring the radiation safety of nuclear power plants are problems connected with the burial of radioactive wastes and possible accidents. There are at present several alternative ways to bury radioactive wastes that are formed both in the operation of nuclear power plants and in the processing of nuclear fuel. The most widespread technique is that of burying the wastes in geological formations, old salt mines, and deep natural caverns. Prior to burial, the wastes are subjected to various kinds of treatment: encasement in cement, glass, or concrete. The search continues for the most effective ways to bury the wastes. Thus, the International Atomic Energy Agency's program calls for the creation of international and regional nuclear centers for the processing of irradiated fuel, treatment and removal of radioactive wastes, and the manufacture of fresh fuel in international centers located in a restricted number of places in the world.

The possibility of accidents in carrying out a nuclear fuel cycle is considered most thoroughly in designing nuclear power plants. Units have now been developed with a reliability level that is unmatched in contemporary production. A World Health Organization task force which studied the impact of nuclear power on the environment showed that a reactor accident threatening thousands of persons could occur only once in every 100 million years. In the quarter-century since the world's first nuclear power plant went into operation, there have been no accidents resulting in the emission of dangerous quantities of radioactive products posing any threat to human life.

Thus, nuclear power is acceptable not only in terms of economics but also in terms of environmental impact. Further improvement of nuclear power plants and strict compliance with environmental protection laws in the USSR guarantee the successful and safe development of this promising sector.

6854
CSO: 1822/214

MEASURES FOR IMPROVING EFFICIENCY, RELIABILITY OF ELECTRIC POWER

Moscow SOVETSKAYA ROSSIYA in Russian 19 Jan 84 pp 1-2

[Article by Yu. Burov, V. Ovcharov, I. Ognev, special correspondents: "The Unreliable Kilowatt"]

[Text] Practice shows that a diligent attitude toward the national welfare to an ever greater degree guarantees that our plans are realistic. The December (1983) Plenum of the CPSU Central Committee, having thoroughly analyzed the current developmental problems of the national economy, emphasized the current primary importance of the economic consumption of all types of resources.

Electric power is one of the most important resources on their list. But it is perceived as the least tangible resource: the kilowatt-hour is nothing like an oil tank, natural gas reservoir, or an armload of wood. This "invisibility" is its very advantage: electricity is much more technological than any other type of power and is less polluting. But, alas, many have come to think of electric power as not subordinate to strict inventory. However, we will begin with a positive example, which shows what sort of resources are hidden here.

Kalinin Millionaires

Several years ago an automatic system to control electric power consumption, ASU-ENERGO, was persistently introduced at one of Kalinin's enterprises. Why was this needed?

Electric power consumption is accompanied by clearly defined morning and evening "peaks". There are two solutions to this situation: additional introduction of new electric power plants or limitation of electric power consumers. Introducing new capacities is labor-consuming, expensive and slow. Therefore, the second method is more often used: Minergo distributes to industrial and other enterprises instructions indicating how much and the maximum capacity needed by each organization for its power needs. These limits are calculated on the basis of the power systems' capabilities. Penalties (in a 10-fold proportion) are also enforced for exceeding the set limits. However, there is still a large deficit at the "peak" hours. Why? Present methods of controlling electric power consumption are clearly obsolete. There are no instruments which could indicate how much and how many kilowatt-hours and how much capacity an enterprise needs. Plant, factory and combine seem to work

blindly, without the ability to follow and influence the procedure for power consumption. All this means that the purse is not bottomless, but we spend from it as if it is.

This was the situation at the Kalinin Excavator Plant before they installed the ASU. Its work results have surpassed the most optimistic expectations. Here is one statistic: with its introduction, 400,000 kw-h of electric power were conserved. It has been several years and the plant has not once exceeded the electric power consumption limit set for it at peak hours. Its annual consumption has stabilized, although its production volume is increasing.

The automated system allows the plant to plan and at any moment account for the load and power consumption, and supply the required amount in workshops, sections and in each steelmaking brigade. Of course, these data are figured on the results of the moral and material stimulation of competition. Everyone was a winner: workers, enterprise and state. Unfortunately, there are still few of these examples. An unannounced inspection revealed more sobering facts.

Dual Standstills

Relatively recently SOVETSKAYA ROSSIYA wrote about the unreliability of the power supply from Tyumen's oil and gas fields. Every year more new deposits must be developed here, but this is impossible without a sufficient amount of electric power. For 3 years running the USSR Minergo's enterprises have not fulfilled the oblast's LEP [Electric Power Transmission Line] construction plan. Much of the equipment was "planted" on temporary lines built by the oil and gas workers themselves. Not relying on homemade LEPs, prospectors use autonomous electric power stations. As a result, fuel and labor resources are over-consumed.

Thus the sluggishness of Minergo's Tyumen-based subdivisions results in dual losses: a tardy kilowatt causes serious damage - a shortage of fuel and chemical raw material. For example, at the beginning of October 1983, power workers turned off power at the Srednyy Priob' fields for 20 hours. As a result, oil workers have still not managed to bring the number of operative boreholes up to the September level. It was estimated that about half a million tons of oil has not been recovered due to power-supply failures.

After this incident, Deputy Minister of USSR Power Engineering and Electrification G. I. Tikhonov visited the oblast. In response to the oil workers' complaint, he emphasized that they must be prepared for new outages, of which there would be about 100 during construction of the Surgut-Nizhnevartovsk LEP-500. How much more fuel would they fail to recover if this actually happened?

Unfortunately, this is not the only example. The first power unit of the Balakovo AES [Nuclear Power Plant] is scheduled to come on line in 1984. They are very busy at the construction site; every hour counts. But much time is wasted due to electric power outages: cranes and concrete pumps stand idle and electric welding arcs are extinguished. The electric power capacity needed by

builders is relatively small. But interruptions in its supply threaten to set back the startup of a 1 million-kw capacity aggregate.

The Saratov oblast national control committee informed us of several facts revealed during inspection of the livestock's winter quarters. On 9 December, without warning, the electric power was shut off for 5 hours at 4 farms in Perelyubskiy Rayon. There was no electric power for 2 days at the Pobeda and Novaya Zhizn farms in Ivanteyevskiy Rayon. Mechanical milking was disrupted at a number of farms in the Balashov, Ozinskiy and Pugachevskiy rayons. But winter is the stock breeder's harvest.

It would be possible to continue listing such situations. But we emphasize the main point: no action is taken against power engineers regarding damages caused by power outages. In controversial situations the "Rules for Electric and Thermal Power Use" are quoted, which states that they are responsible for all users, regardless of professional affiliation. But the rules were established by Minergo's authority. Of course, they are perforce of a bureaucratic nature.

When we asked Gosarbitazh's chief state arbiter for Saratov Oblast, V. A. Kuznetsov, how conflicts between Minergo's subdivisions and enterprises were resolved, he recalled a particular incident. Recently, one of the oblast center's plants, due to a sudden outage, suffered hundreds of thousands of rubles in damage. But it did not dare to bring suit, knowing that the situation was hopeless. This is how the balance of rights between electric power producers and users appears in practice.

Obstacles to Quality

Recently a representative scientific conference was in progress in Saransk. At the height of the debate, the light in the hall suddenly went out. But the conference continued. Not only because scientists - unlike assemblers at a conveyor - can exchange opinions in darkness. The fact is that, little by little, they are becoming used to electric power outages. Moreover, at plants, farms, in theatres and apartment buildings, people have begun to adapt to it. No matter how costly this is to the national economy.

According to data from the laboratory of the All-Union NII [Scientific Research Institute] of Light Sources imeni Lodygin, the voltage in the majority of the nation's networks fluctuates by almost 100 units - from 170 to 265 volts. These leaps cause electric instruments, equipment and machinery to malfunction before the planned term. Therefore, many more of them than necessary must be produced. For instance, a 100-watt lamp designed for a voltage of 220 volts should serve no less than 1,000 hours. However, due to voltage fluctuations, this term is reduced to 167 hours, or to one-sixth of the normal term. Instead of one lamp, we must purchase six.

"Voltage fluctuations in the network", says V. G. Shaborkin, senior scientist at the VNIIIS [All-Union Scientific Research Institute of Light Sources], "have necessitated the design of variable-voltage lamps. But how many and what kind must be produced? Which rayon should receive them? In order to answer these

industrial and commercial questions, we methodically measure the networks' voltage and produce special tables."

Let's sum up. The experience of the Kalinin Excavator Plant, outages at the Tyumen fields, the farms in Saratov Oblast, and the construction site in Balakovo, and finally, the necessity of producing electric lamps and other electric appliances because of low-quality electric power are the verges of one large important problem.

We might reproach the USSR Minergo for its slower than planned construction of electric power sources. Such a reproach would be justified. But it is remarkable that electricity consumption and introduction of new capacities are growing at approximately equal rates. The sizes of the deficit, as attested to by many years of statistics, especially in peak-load hours, remain constant. It is possible that the old debts of the power workers are having an effect. All the same, let's not blame all the sins on a single ministry.

We consumers are still very extravagant with energy, especially electricity. Not only because we are prodigal. There is an objective reason: there is no foundation in this country for production of the necessary apparatus to simply and accurately control consumption of kilowatt-hours and capacity. True, there is a special organization, Glavgosenergonadzor, with a wide network of local specialists. But it also lacks the tools with which it could better fulfill its obligations. How can hundreds of inspectors watch over thousands of enterprises? It would be more accurate to view the organization summoned to guard the economic use of power as contemplating power losses.

The practice of superior enterprises has blazed several paths to elimination of the existing situation. Like the Kalinin workers, those at the Moscow Automobile Plant imeni the Lenin Komsomol strictly account for power consumption. A special system, which long ago paid for and proved itself, is in force there. There are also larger scale examples. In Estonia, a contact clock is installed in each electric heating boiler in agriculture. By shutting off power at the peak moments of load they reduce the republic's consumable capacity by 42,000 kw. Sensible organizational measures not requiring material expenditures also have a large impact. For instance, specialists of the State Scientific Research Power Engineering Institute recommended that the directors of the Volgograd Krasnyy Oktyabr' Plant change the work schedule of steelmaking furnaces in such a way that the periods of maximum power consumption were separate from peak hours. Introduction of this proposal reduced the consumable capacity by 15 percent.

We are still clearly lacking a diligent attitude toward electric power. Nevertheless, there are models which must be emulated. They must be developed and introduced everywhere. Then the kilowatt will become more reliable. Minenergo and the users of its products have an equal interest in this.

12421
CSO: 1822/184

BRIEFS

LEP-330 ERECTED IN AZERBAIJAN--(AzerINFORM)--A power transmission line from Azerbaijan GRES [State Rayon Electric Power Plant] to Agdam will make it possible to improve the power supply to industrial and agricultural enterprises of central and western Azerbaijan and to increase its reliability. It was erected by installers of the Kavkazelektroset'stroy Trust in a record short time - only a month. The 38-km long LEP-330 will enable full utilization of the power produced by the recently introduced third power unit of Transcaucasia's largest thermal electric power plant. This year, construction of the LEP will be continued in this rayon. [Text] [Baku VYSHKA in Russian 5 Jan 84 p 1] 12421

ZIMA-BALAGANSK LEP ERECTED--Irkutsk (TASS)--The 110-kv capacity Zima-Balagansk electric power transmission line (LEP) will provide a reliable power supply to the remote enterprises of the Ust-Ordynskiy Buryatskiy Autonomous District. The Vostsibelektroset'stroy Trust undertook construction of the power bridge. The LEP is being erected by installers who distinguished themselves during construction of the Baykal-Amur Mainline. This year they will complete the first 20 km. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 17 Dec 83 p1] 12421

NEW UKRAINE-BULGARIA LEP-750--Odessa (TASS)--The new LEP-750 [Electric Power Transmission Line] will improve the power supply to southern Ukraine, Moldavia, and a number of rayons in Bulgaria, Hungary and Rumania. It will extend from the Southern Ukrainian AES [Nuclear Power Plant] to Dobrudzhi, Bulgaria. The foundation of the line's first support has been laid. A large volume of work must be completed on the route, the length of which is about 400 km. The line will cut across large water bodies - the Yuzhnyy Bug, Dnestr and Dunay. Supports almost as high as a 40-story building will be erected in order to join their banks. Bulgarian and Rumanian builders began working simultaneously. It is planned to make the new LEP fully operational by November 1985. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 8 Feb 84 p 2] 12421

NEW POWER FACILITIES IN SAYANSK COMPLEX--Abakan--The transformer capacity of the Sayansk Territorial Industrial Complex is now 2,665,000 kv-amp. Such very large facilities as the Abakan-500 substation for producing the capacities of the Sayano-Shushenskoye GES [Hydroelectric Power Plant], the LEP-500 [Electric Power Transmission Line] from the Sayany to the Kuzbass, and thousands of kilometers of other electric power transmission lines with supports crossing the taiga came on line here. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 5 Jan 84 p 1] 12421

NEW LEP ON LINE IN ARKHANGEL'SK--Arkhangel'sk--Windows in the homes of the towns, villages and countryside of western and southwestern Arkhangel'sk Oblast have begun shining more brightly. A 220-kv Novodvinsk-Obozerskaya-Savinskiy electric power transmission line (LEP) came on line here. The new 183-km long LEP will make it possible to increase considerably the reliability and quality of the power supply of enterprises and individual power users in Plesetsk, Onega and Kargopol'ye rayons. [By Ye. Goloshumov] [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 31 Dec 83 p 1] 12421

POWER-ENGINEERING CABLE PRODUCED--This year several of the socialist obligations of the collective of the Sevkabel' Association provide for development and output of products for national power engineering. Plant designers have directed their efforts toward speeding up production of innovations. On the eve of the anniversary of Great October, a month before the deadline, a pilot model of a 220,000-volt cable lead to an electric-gas switchgear was produced. An experimental model of a 330,000-volt oil-filled cable was designed and produced above the plan. The association's specialists and workers were especially satisfied to learn that the State Mark of Quality was awarded to one of the high-voltage cable apparatus products - a 110,000-volt lead to an electric-gas switchgear. [By K. Mishin] [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 10 Nov 83] 12421

PERMAFROST FIRE DRILL--Khar'kov--A fire "drill", developed by scientists of the Khar'kov Aviation Institute jointly with Tula specialists, cuts through permafrost ground like a knife through butter. Streams of hot gas tearing from the nozzle at supersonic speed easily heat up the permafrost to a depth of 20 meters. This unique device, mounted on a tractor, will be a reliable aid during building construction, mineral prospecting and laying of power transmission lines. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Feb 84 p 2] 12421

CSO: 1822/184

ENERGY CONSERVATION

CONSERVATION IN POWER INDUSTRY REVIEWED

Moscow ENERGETIK in Russian No 3, Mar 84 pp 17-18

[Article by I. I. Belyayev, engineer of Soyuztekhenergo [Industrial Association for Adjustments, Improvement of Technology, and Operation of Electric Power Stations and Power Grids of the USSR Ministry of Power and Electrification]: "Results of the All-Union Joint Review of the Effectiveness of the Utilization of Raw Materials, Materials, and Fuel and Power Resources" under the heading: "Socialist Competition - Organization and Effectiveness"]

[Text] In 1982, in the associations and organization and at the enterprises of USSR Minenergo [USSR Ministry of Power and Electrification] the next stage of the All-Union Joint Review of the Effectiveness of the Utilization of Raw Materials, Materials, and Fuel and Energy Resources was carried out in accordance with the decree of the CPSU Central Committee and the USSR Council of Ministers on "Strengthening work on the conservation and efficient utilization of raw materials, materials, fuel, power, and other material resources".

In the course of the review, by comparison with the industrial norms, the following savings were made for the industrial sector as a whole: 24,900 tons of rolled metal, 87,440 tons of cement, 43,600 cubic meters of timber, and 1.82 billion kW-hrs of electrical energy. The specific fuel consumption for the electrical and heat energy released in 1982 amounted to 327.5 grams per kW-hr and 172.8 kg per gigacalorie respectively.

The collectives of Glavuralenergo, Glavsevzapenergo, Belglavenergo, Turkmenglavenergo, and Estonglavenergo [Main Administrations for the Operation of the Power Systems of the Urals, the Northwest, the Belorussian SSR, the Turkmen SSR, and the Estonian SSR], of the Energostal'konstruktsiya Trust, of Glavenergostroymekhanizatsiya, of the All-Union Association Soyuzelektromontazh, and of Soyuzgidroenergostroy took a most active part in the All-Union review in 1982.

The review contributed to a more widespread enlistment of the workers in creative work on utilizing unexploited industrial resources and to the maintenance of conservation and economy.

Much work was done by the enterprises of the sector on mastering the burning of the kinds of fuel that are not in short supply. At the Tom-Usinsk GRES the burning of low-grade, high-ash, Khakass coals was mastered. At present, the Tom-Usinsk and Belovsk GRESs are assimilating the burning of the low-grade, oxidized, high-ash coals of the new Taldinsk and Karakansk open pit mines. At three electric stations of the REU [Regional Electric Power Administration] of Kuzbassenergo [Kuznetsk Basin Power System] have mastered the burning of excess natural gas and also the waste gases from blast furnace and coke production. Because of this, in 1982 alone, about 9 million tons of scarce forge coal was released for other uses.

At the Zainsk GRES the burning of gas having an elevated content of mercaptan compounds was mastered. Formerly this gas was burned in flares at the Orenburg gas processing plant. As a result of the Zainsk GRES accomplishment, more than 5 million^3 of petroleum-associated gas was saved.

The development of socialist competition in the industry had a substantial effect on the results of the review of the effectiveness of the utilization of materials and fuel and energy resources.

The enterprises of the Krasnoyarsk power system, in the 11th Five-Year Plan, took part in the competition of the Krasnoyarsk Kray enterprises the basic purpose of which is to give the country one billion rubles in supplementary production.

The competition is being carried out under the slogan: "Productive assets must give a high yield, productive capacity must be fully utilized". The enterprises of the Krasnoyarsk REU brought in for the Krasnoyarsk goal of a billion in supplementary production 14.7 million rubles from savings in the cost of electrical and heat energy, from the introduction of the achievements of scientific and technological progress, from an above-plan output of electrical and heat energy, from an increased return on investments, and from the fullest utilization of productive capacity.

The widespread development of socialist competition for increasing the efficiency of production served principally to generate patriotic initiative in the collectives of the industry. Many enterprises worked under the slogans: "Save fuel and electrical energy at every work place", "Save in large and small ways", "In the 11th Five-Year Plan open a personal account for conservation and economy", and "Effectiveness and high quality work on saving fuel and energy resources".

The call of the Zaporozhye GRES to compete under the slogan: "The 11th Five-Year Plan must be highest in conservation with minimum expenditures" was supported by thousands of power specialists in the country.

The initiative of the institute Gidroproyekt [All-Union Order of Lenin Planning, Surveying and Scientific Research Institute] imeni S. Ya. Zhuk to raise the scientific and technical level of projects and the level of the conservation of labor and material resources, in the first half of 1983 reduced costs in power engineering construction by 30 million rubles. The reduction of labor in construction amounted to 1.3 million man-days, and 45,000 tons of metal and 60,000 tons of cement were saved.

The continued spreading of the initiative of the Sredne-Uralsk GRES resulted in the competition: "For the richest personal accounts of savings in conservation and electrical energy". More than 600 workers opened 202 personal accounts for savings into which 586,600 rubles were put. The initiator of the competition, a mechanic at a 300 MW power plant and Laureate of the State Prize in 1982, A. M. Makarov, took an obligation to save 3500 tons of standard fuel. Over two years of the Five-Year Plan, more than 1100 tons of saved fuel has been credited to his account.

B. A. Yampol'skiy, a mechanic of a power unit of the Belovsk GRES and a best worker in the profession of USSR Minenergo, came forward with the initiative: "We must maximize the output of electricity and minimize fuel consumption". In 1982 he saved 825 tons of standard fuel and 445,000 kW-hrs of electrical power.

At the Kurakhovka GRES of the REU of Donbassenergo [Don River Basin Power System] more than 100 collective personal accounts for saving , and more than 150 individual accounts were opened.

In the repair section for fuel delivery equipment, the brigade of V. G. Olyanetskiy brought in 26,000 rubles for a personal account for the brigade.

At the Kostroma GRES more than 1,200 persons are working on collective or individual personal accounts for saving. Over the 2.5 years of the 11th Five-Year Plan, savings of funds in the total amount of 1,484,400 rubles were brought in for the personal accounts for effectiveness. At eight power stations of the Mosenergo REU [Moscow Regional Power Administration] in 1982, supplementary savings in the amount of 174,000 rubles have been received since the introduction of personal accounts for saving.

In the Kustanayenergo REU [Kustanay Regional Power Administration] more than 2,000 workers and ITR [Engineer and Technical Workers] are taking part in a competition in savings and personal obligations. Personal accounts have been opened for each operator of the power system. So, at the Rudnensk TETs, automatic machine operators V. I. Shumskikh, G. N. Kondrat'yev, and A. P. Volkov,respectively, saved 224 liters, 195 liters, and 194 liters of combustible and lubricating materials. On days of communist "sabbaths", their automatic machines worked on saved fuel.

The introduction of personal accounts for saving eliminated a formalistic approach to the matter of conservation in the use of fuel and energy by strengthening the monitoring and selection of the most economical conditions for the operation of equipment.

One component of the problem of conserving and efficiently using fuel is keeping track of and monitoring the delivery of fuel to an enterprise. Record keeping for fuel is accomplished on the basis of the rules for keeping track of fuel at electric power stations.

The personnel of the fuel transport shop of the Nevinnomyssk GRES took part in a competition to reduce the idle time of tank cars after drainage, to reduce the loss of fuel during drainage, and to reduce the occurrence of under loading. As the result, in 1982, 30,000 rail-car-hours and about 7,000 tons in the under loading of fuel were saved and the idle time of tank cars after drainage was reduced.

In the course of the review much work was done on uncovering and utilizing unused internal resources.

The initiative: "A second life for dismantled materials" was widespread at enterprises in the sector. Belglavenergo obtained important results in the secondhand use of materials. Because of the reuse of metals, pipes, lumber, and reinforced concrete attachments, a saving of more than 600,000 rubles was made.

During the conduct of the review, attention is being paid to strengthening, in the course of energy supervision, of the monitoring of efficiency in the electrical and heat energy consumption by national economic, and general municipal, consumers.

The main thrust of work in energy supervision is systematic monitoring of the fulfillment at enterprises of the established norms for electrical energy consumption and the assignments for the reduction of that consumption. In the process of the monitoring, the dynamics of the norms for consumption over the years of the Five-Year Plan are analyzed, the correctness of their calculation, differentiation, and structure is verified. Also verified are the availability and practicality of the production norms for the most energy consumptive kinds of production, the actual electrical energy consumption, the influence of the principal and supplementary organizational and technical measures on the planned norms or actual expenditures, and other matters.

Serious work on saving fuel and energy resources in the industrial enterprises of the republic has been done by Gosenergonadzor [State Power Inspection Service] of Turkmenglavenergo. In 1982 the industrial enterprises of the republic saved 60.1 million kW-hrs of electrical energy and 10,100 gigacalories of heat. For overconsumption of electrical energy beyond planned consumption, 123 enterprises were charged an increased fee for a total of 7,207,000 rubles.

At the enterprises of the Krasnoyarsk power system important work has been done on limiting the consumers of electrical and heat energy and also on the efficient consumption of energy resources by consumers. The assignment for limiting electrical energy consumption was fulfilled and 531,300 kW-hrs were saved.

The central reviewing commission of the USSR Minenergo and the Central Committee of the trade union of electrical power station and electrical engineering workers carried out verification after the conduct of the review.

In the main administrations for power engineering and the organizations comparable to them and also in their subdivisions, review commissions were created.

The active komsomol members at the enterprises, the people's control groups, and the councils of the primary organizations of the NTO [Scientific and Technical Society] EiEP [expansion unknown] and the VOIR [All-Union Society of Inventors and Innovators] took active part in the work of the reviewing commissions.

Raids carried out by the reviewing commissions to check on the regulations for the storage and use of fuel, chemical reagents, cement, metals, and other material values are bringing in a substantial contribution to conservation and economy. The raids have uncovered shortcomings, losses, and unused productive resources. The shortcomings revealed have been discussed at general gatherings, meeting of the local committees of the trade union, and at the permanent industrial conferences.

In delivering the results of the joint review, account was taken of the fulfillment of the principal indicators of production and economic activities and of socialist obligations in the year's operational results. Account also was taken of the fulfillment of the principal indicators of the review, and the results of the inventory of merchandise and material values.

The results of the review were presented to an expanded session of the committee of the trade union together with the administrations and reviewing commissions of the enterprises. Having summarized the results of the year's work, the reviewing commissions of the enterprises presented the data on the results of the review to the reviewing commission for the industry where the most effective collectives were determined.

The following collectives were recognized as the best in the industry according to the results of the All-Union review of effectiveness in the utilization of raw materials, materials and fuel and energy resources:

Dneproenergostroyprom PO [Industrial Association]
Turkmenglavenergo
Kustanayenergo REU
Sredne-Uralsk-GRES
Tom-Usinsk GRES
Zaporozhye GRES
Berezovsk GRES
Ali-Bayramlinsk GRES
Litovsk GRES
Southern electrical networks of Moldglavenergo
Spetsset'stroy
Kavkazelektroset'stroy
Elektroyuzhmontazh
Kolymagesstroy US [Construction Administration]
Tatenergostroy
Ivanovsk Machinery Plant
Yuzhenergoteploizolyatsiya Combine
Elektroshchit Plant
Yakutskenergo REU
Tashkent GRES
Stavropol GRES
Kurakhovka GRES
Krasnoyarsk GRES-2
Kolsk TETs-21
Mosenergo
Krasnodarsk TETs
PPR Estonenergoremont
Moldglavenergo
Yuzhatomenergostroy Trust
Elektrosredazmontazh Trust
Gruzgidroenergostroy Trust
Dnestrovsk Comprehensive Hydraulic Development
Energotekhmash Association

It should be noted that a number of enterprises and organizations of USSR Minenergo displayed shortcomings in the review. In a number of power systems, specific fuel consumption was higher than in 1981. There was a deterioration in the economy of operation of 300 and 500 MW units at several electric power stations. In a number of subdivisions there was an increase in electrical energy consumption in its transmission in the power grids, and there were other deficiencies.

Having considered the report presented by the industry review commission, the board of ministers and the presidium of the Central Committee of the trade union rewarded the winners of the review.

9136
CSO: 1822/234

GEOTHERMAL SPACE HEATING RECOMMENDATIONS

Moscow ENERGETIK in Russian No 3, Mar 84 p 20

[Article: "The Use of Hot Springs for Heating Dwellings and Industrial Buildings" under the heading: "In the Scientific and Technical Council of the USSR Ministry of Power and Electrification"]

[Text] The Scientific and Technical Council has considered the technical and economic report of VNIPIenergoprom [All-Union Scientific Research and Planning Institute of the Power Industry] and of DagENIN [Dagestan Power Engineering Institute] on the use of hot springs for supplying heat in the territories of the Georgian and Armenian SSR, the Dagestan and Chechen-Ingush ASSR, and the Stavropol and Krasnoyarsk Krays.

Hot springs water resources amount to approximately 25 million m^3 per day and their heat potential (with a coefficient of 0.5) is about 200 million gigacalories per year. This can provide a saving in standard fuel of almost 35 million tons per year. The temperature of hot springs water is from 30 to 110 C, its mineral salt content is from 0.1 to 30 grams per liter, and its depth of occurrence is from 800 to 3000 meters.

In the Northern Caucasus at present, 20 hot spring water intakes of various heat potential are operative, and in Georgia there are more than ten. Only 19 percent of the heat output of the operative hot spring water intakes is being utilized. Basically, this is explained by the use of traditional heating devices (M-140 radiators, finned cast iron tubing, and so forth) and in so doing the degree of mineralization of the water is not taken into account. A number of schemes are presented in the report for geothermal heating for water with various degrees of corrosiveness and capacity for scaling. In the struggle with these drawbacks it is proposed to introduce chemical reagents into the hot spring water and to use ultrasonics. For heating devices, radiant panel systems are recommended (particularly, radiant floor and ceiling panels) with the greatest possible reduction of the water discharged.

According to forecasts, the use of the hot springs resources of the Northern Caucasus and Georgia can replace more than 1.5 million tons of natural fuel per year. The national economic gain can amount to 37.5 million rubles per year because of the saving of fuel and of giving up the construction of boiler installations.

The conclusions of the work were approved by the Scientific and Technical Council. The VNIPIenergoprom proposed considering the use of geothermal water as an alternate design in the development of heating systems in the Northern Caucasus and Georgian regions.

9136
CSO: 1822/234

UNIFIED POWER SYSTEM PEAK LOAD REDUCTION

Moscow ENERGETIK in Russian No 3, Mar 84 p 5

[Article by engineers A. I. Yefimov and G. A. Svetlov of Volgogradenergo [Volgograd Electric Power System]: "Reducing the Peak Load on the Electric Power System"]

[Text] To assure the reliability of the USSR Unified Electric Power System (UEPS), a need is developing to lower the power demand in the hours of peak loading.

Practically, the solution of this problem is fraught with stubborn difficulties. On one hand, the amount and time of the restrictions should correspond exactly with the assignments of the Central Dispatcher Control (CDC) of the USSR UEPS, and on the other hand, all these restrictions should be implemented with the fewest losses for the national economy. The difficulties grow in proportion to the introduction at industrial enterprises of new production capacity, to the growth of the proportion of unregulated loading, to the withdrawal from the schedules of restrictions of production involving continuous technological processes, and so on. It is apparent that regulating loading under these conditions can be accomplished only at the expense of an increase in the number of participants in regulation, of more rigidity in restrictions, of the use of differential rates, and of the strengthening of monitoring.

The process of calculating and working up limits for enterprises, basically, has been worked out, but the receipt of reliable information from localities about the actual requirements presents significant difficulties. The organization, everywhere, of rigid monitoring of the load of every consumer, under present conditions, is impossible because of the necessity of assembling a large number of people and much transportation.

To increase effectiveness in realizing the assigned restrictions on industrial enterprises, a system for thorough regulation of loadings was developed and applied at the enterprises of the Volgograd and Astrakhan oblasts over the fall and winter of 1981-1982.

In essence, the regulation system is that enterprises with average power demands work out together with the power system and put into effect daily measures for reducing the load by 25-50 percent of the power requested with a

duration of this restriction of not more than one of the hours previously agreed upon with the power system. Large energy-consuming enterprises do not participate in this system of restriction; that is, they remain in reserve and are restricted only if necessary.

Additional restrictions are not imposed on enterprises in the system who fulfill the schedule of thorough regulation. Enterprises that violate the schedule are punished by the establishment for them of an increased rate, which is higher by a factor of ten than the basic rate. This is calculated not on the basis of the limit, but on the power requested for the quarter. Monitoring of the fulfillment of the agreed schedule is accomplished with the aid of technical means; namely, meters with indicators of the maximum loading.

The application of this system at 156 enterprises in the fall and winter of 1981-1982 and at 178 enterprises in 1982-1983 demonstrated a high effectiveness. The enterprises are lowering the load on the power system in the peak hours of the morning by a total of 67, and in the evening by a total of 103 MW. On the whole, for the Volgograd power system in 1982, the peak loading increased by 0.6 percent while there was a 2.2 percent growth in the demand for electrical power. In the first quarter of 1983 the demand for electric power grew by 2 percent compared to the first quarter of 1982, but the peak load at the peak hours for the associated power systems remained at the previous level.

9136
CSO: 1822/234

GENERAL

DEPUTY MINISTER DISCUSSES LONG-RANGE PROSPECTS OF ENERGY PROGRAM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Dec 83 p 2

/Article by A. Makukhin, USSR first deputy minister of power and electrification: "A Project for the Future"/

/Text/ For us electric-power engineers the present year has not been quite an ordinary one. This year the USSR Energy Program for the Long-Range Future was adopted and is already being put into practice. For the country's national economy it has become an extremely important document for the long-range future, a kind of GOELRO under present-day conditions, as this program was called by Comrade Yu. V. Andropov in his speech at the June (1983) speech at the CPSU Plenum. It is difficult to over-estimate its importance: it is called upon to carry out a structural, technical, and organizational-economic re-structuring of the economy, to shift it to an intensive, energy-conserving path of development.

At the present time four-fifths of the total quantity of electric power is produced by our traditional "electricity factories"--thermal electric-power stations. It is they which consume more than half of all the extracted coal, petroleum, and gas. To put it bluntly, we are not being very zealous in managing this economically. Moreover, the natural resources are gradually becoming depleted. We simply do not have the right to count further upon the generosity of the earth's inner treasures. And so we ourselves must re-examine our attitude toward fuel.

The Energy Program has provided for a fundamental re-structuring of the fuel-and-energy balance, including that achieved by means of an accelerated development of nuclear electric-power engineering. Already now nuclear electric-power stations are providing more than seven percent of the total amount of electric power in the country, i.e., as much as could be obtained from 30 million tons of coal. Integrated electric-power units have been set up and put into operation; they meet the demands of advanced construction and operations technologies. These units can be manufactured under plant conditions, making extensive use of the pre-fabrication principle.

We are employing such a principle now in building the Zaporozhskaya AES /nuclear electric-power station/, with a capacity of 4 million kilowatts. Start-up is being prepared for the first electric-power units at the Kalinskaya AES, as well as at the Ignalinskaya AES--the largest nuclear reactor in the world is

being built here. Construction work is continuing on the Kurskaya, Chernobyl'-skaya, and a number of other stations, while the construction of new ones is getting underway. During the 11th Five-Year Plan the output of electric power and nuclear electric-power stations will triple.

Nuclear electric-power engineering will also take upon itself the task of supplying heat to big cities. Nuclear boiler units are already under construction in Voronezh and Gorkiy, as are ATETs's /nuclear heat and electric-power stations/ in Odessa and Minsk. Just putting the Odessa ATETs into operation, for example, will allow us to reduce the annual expenditure of fuel by 2 million tons and to eliminate small boiler units, which are polluting the city's air. To put it briefly, nuclear electric-power engineering is confronted with major scientific and technical problems. And, in addition to all the rest, it must become the most important factor in economizing on mineral fuel, which is in short supply.

The problem of a conservationist attitude toward non-renewable natural resources also requires efforts from us along other lines. In particular, we must make more extensive use of the force of renewable energy sources--hydro, solar, geothermal, as well as ocean tides and wind. Of these, hydro-power has been developed to the greatest extent: its share accounts for more than 12 percent of the total production, which allows us to make an annual saving of about 60 million tons of organic fuel. Is this too much or too little?

As measured by GES capacity, we are now second in the world behind the United States, while, as measured by electric-power production, we are in third place --behind the United States and Canada. Thus, in comparison with world indicators, we look quite good. But if we compare what has been achieved with the potentials, then it must be admitted that we have up to now developed only one-fifth of our economically effective hydro-resources. We still have quite a bit of work to do in order to economically harness the mighty force of our rivers.

A considerable amount is already now being done to accomplish this. Engineering methods and heavy-duty equipment have already been developed and are being introduced which allow us to conduct construction and installation operations on a year-round basis under the harsh conditions of Siberia, above the Arctic Circle, and the Far East. Of course, it is precisely here in these regions where the potentials of the rivers have still remained extremely underdeveloped, and it is here that there are still considerable hidden reserves for creating large-scale industrial complexes.

A large effect will be provided by the development of the hydroelectric-power resources of the Angaro-Yenisey Cascade. During the present five-year plan construction will be basically completed on the Sayano-Shushenskaya GES--on the largest in the world. Its rated capacity is 6,400 kilowatts. It has produced its first current.... It has achieved its rated capacity.... Construction work is winding up.... Such reports as these will be coming in from the cascade's other stations during the present five-year plan. In toto, this region will provide the national economy with more than 200 billion kilowatt-hours in the foreseeable future.

Use of the rivers of Siberia and the Far East is important, but not the only way to develop hydroelectric-power engineering. We are also placing great hopes on the comprehensive development of the water resources of Central Asia and Kazakhstan; this will allow us not only to obtain cheap energy but also to regulate the flow of the rivers, to re-distribute it in order to irrigate mass areas of agricultural lands.

At the same time Soviet hydroelectric-power engineers are mastering an effective trend which is new for us: the creative of water-storing electric-power stations. Their operation does not require that a river be "harnessed." They, so to speak, accumulate the surplus power of nuclear and thermal electric-power stations during the night-time hours, and, during the day-time and evening "peak-load" periods, they give it back. At present we are building two such stations--the Zagorskaya near Moscow and the Kayshyadorskaya in Lithuania. During the next few years their number will increase sharply. By the end of the five-year plan the capacity of hydroelectric-power stations will be increased by more than 12 million kilowatts.

In speaking about the use within the national economy of renewable energy sources--solar, geo-thermal, tidal, and wind--it is necessary to note their enormous potential resources, inexhaustibility, and ecological purity, plus the fact that they contain the possibility of maintaining an equilibrium in the planet's thermal balance. All of this makes their industrial development extremely enticing.

In the immediate future construction will be completed in the Crimea on a modest-sized, experimental-industrial, solar-type, electric-power station--the prototype of future giants, which will be more powerful by two orders of magnitude. And on the agenda are combination solar-fuel electric-power stations, possessing a number of advantages in comparison with their individual variants. It is precisely here that the real path of global attraction of solar energy into industrial usage may be seen.

Geothermal waters likewise promise us great fuel savings. Their use has particularly good prospects for a number of regions in the country's European part. It is intended, for example, to build a GeoTES /geo-thermal electric-power station/ with a so-called underground circulation system in Stavropol Kray and another one in Dagestan. The Far East has great reserves of geo-thermal energy at its disposal: its potential is fully sufficient to satisfy the region's needs for several decades. Therefore, in addition to the stations already existing here, we are planning to build in Kamchatka only one more, with a capacity of 200,000 kilowatts.

With regard to energy from tides, it is necessary to thoroughly study all the ecological consequences of building tidal stations. Such a station has been in operation--by way of an experiement--for many years on the Kola Peninsula near Murmansk. And, although its capacity is not great, this experiment has made it possible to proceed to the planning of new, larger, tidal-type, electric-power stations. Already now the possibility of establishing them on the coasts of the White Sea and the Sea of Okhotsk has been determined. Nor have our scientists and planners passed over the "great wind-power engineering" possibilities. Research has demonstrated the possibility of creating plants

with a unified capacity of 10,000--15,000 kilowatts already now. But in the future we are counting on attaining station capacities of 10 million--15 million kilowatts. However, they will become effective sources of electric power only in the event their manufacture is placed on a serial, industrial basis.

But it is the development of a controllable, thermonuclear synthesis which must be considered as the principal scientific and technical task of the present century. The first experimental Tokamak-10 plant was designed and assembled in the USSR; it has received international recognition by specialists. According to our forecasts, the first electric-power station with a thermonuclear reactor will already appear at the beginning of the coming century. This will constitute a global solution to the energy problem: because, of course, the fuel for thermonuclear plants is derived from ordinary water.

Tomorrow Soviet electric-power engineers are marking their own professional holiday. Groups of electric-power builders and operators, scientists and specialists--the members of the many-thousand-person army of workers in this sector, recognize their own enormous role in developing the country's economy, speeding up scientific and technical progress, and carrying out the Energy Program.

2384
CSO: 1822/225

INTERPLAY OF VARIOUS ENERGY STRUCTURES, ECONOMY STUDIED

Moscow EKONOMIKA I MATEMATICHESKIYE METODY in Russian Vol 19 No 5, Sep-Oct 83 pp 912-916

[Article by Yu. D. Kononov, Ye. V. Lyubimova and V. N. Tyrtyshnyy (Irkutsk): "Problems of Assessing the National Economic Consequences of Long-Term Strategies for Developing Power Engineering "]

[Text] Since the end of the 1970's, objective factors and trends that testify to the start of a new era in developing power engineering have begun to manifest themselves in the USSR, as in other countries. The singularity here is the change from the preferential use of cheap oil and gas to the use of more expensive and capital intensive but less limited power-engineering resources. This conversion is combined with a considerable increase in the capital and materials intensiveness of the fuel and power complex (TEK) and an intensifying of its effect on other branches of the national economy. These trends have been analyzed in many publications of recent years.

The new setting for developing power engineering presents new requirements in regard to the tasks and methods of study of its interdependence with the economy. The amount of work in this field is growing rapidly abroad. However, as analysis indicates (see, for example, [1]), the main attention is paid to evaluating the dependence of the demand for power-engineering resources on their cost, while the reaction of the economy to an increase in the TEK's requirements for capital investment and other limited resources has been poorly studied.

This memorandum sets forth a method for such research which was developed in SEI [Siberian Power-Engineering Institute] of SO AN ASSR [Siberian Department of the USSR Academy of Sciences], and an attempt is made to give an approximate answer to the following questions. Can long-term strategies for the TEK exert an appreciable influence on the dynamics of macroeconomic indicators? Under what circumstances? Is it possible to decrease its influence and how?

The Research Method

In order to analyze trends in developing the TEK and its interplay with the national economy over the long term, for more than 15-20 years, the SEI used a system that includes a forecasting model for TEK development, a model for

evaluating the requirements of the TEK and the interdependent branches of the economy for national economic resources (IMPAKT), and an aggregated macroeconomic model.*

The model for TEK development [3] describes the technological and regional ties of power engineering at all stages of transformation of the energy, beginning with production of the primary energy (the various types of fuel, nuclear fuel, hydropower, and so on) through the production and distribution of the energy carriers (liquid, solid and gaseous fuel, electricity, steam and hot water) right up to obtaining the final energy that is used directly in industry, transport, agriculture and housing. In so doing, the limitations on the production of energy resources are considered. The model divides the country into four zones, for each of which the dynamics of an increase in the demand for energy are given. The functional of the model is the minimum of the time-adjusted national-economic expenditures for the period.

The model for IMPAKT [4] is a dynamic interindustry model, specially oriented toward power engineering, which considers construction time differential in a clear form, is specially oriented to power engineering. It consists of linear and nonlinear equations that describe for each year of the period being examined the balances for the production of the various types of output and the consumption thereof during the operation and construction of facilities for the TEK and the associated branches, the prerequisites for introducing additional production capacity in industries that interface with the TEK, and the requirements for capital investment and scarce resources (labor, power, material and natural resources). IMPAKT considers all the basic types of fuel and energy, as well as the methods for producing and transporting them. The composition of the branches other than power engineering is limited to the main suppliers of materials and equipment for the TEK and the interdependent production facilities. The model's initial varying indicators are the amounts of TEK production of output and of new power-engineering capacity, and the variables sought are the direct and indirect expenditures for industrial output, capital investment and labor and natural resources for the functioning and the development of power engineering.

The macroeconomic model MIDL (simulated, dynamic, time-differentiated macromodel) performs [5] two functions in the system of forecasting models: it helps to assess, first, the national economy's requirements for fuel and energy and, second, the possible national-economic consequences of the various strategies for developing the TEK. The whole national economy is presented in the form of six sectors, including two capital-forming sectors (machinebuilding and construction). The TEK is not included among them, since the variants for its development are defined in the model for the TEK, and the requirements for the output of each sector and for the resources that correspond to it are the basic varying parameters of the MIDL and are evaluated in the IMPAKT model.

The model's dynamic properties are intensified by introduction of the time differential in construction. Backlogs of implemented capital investment at the end of the computed period are determined on the basis of an extrapolation of the trends in introducing capacity in each sector over the whole period.

*More detailed interindustry models are applied for the medium-term outlook [2].

The economy's unchanging aspects are considered by means of restraints imposed from above on the rate of growth of the industries' output for each time interval. In this case, a reduction in the production level already achieved and a fall in the rate of growth of gross capital investment below that prescribed are not authorized.

The unknown variables are: $x_i(t)$ is the gross output of sector i (at unchanging prices) during the year t; $y_i(t)$ is the output of the industry i that goes into the consumption fund; $z_i(t)$ is introduction of capacity of sector i; $x_\ell(t)$ is the production requirement for fuel or power of the type ℓ; and K(t) is the gross capital investment in the national economy.

The model's parameters are: $E_i(t)$ is the output of the sector i that mandatorily goes to the needs of the TEK; $h_i(t)$ is the share of current expenditures in the value $E_i(t)$; L(t) are the labor resources; $a_{ij}(t)$ are the technological coefficients; $f_{ij}(t)$ are the capital-intensiveness coefficients; T_j is the duration of construction; $\alpha_j(\tau)$ are the coefficients for determining expenditures by year of construction; $c_{\ell i}(t)$ is the energy (or fuel) intensiveness of the output of sector i; $p_i(t)$ are the coefficients of retirement of capacity; d(t) is the minimum permissible pace of growth of capital investment; $\ell_i(t)$ are the coefficients of labor intensiveness; $b_i(t)$ is the maximum permissible rate of growth of gross output of the various sectors; T is the number of periods; and N is the number of sectors.

The model has been formulated as a task for linear programing and it includes the following basic correlations.

$$\max\left\{\sum_{t=1}^{T}\sum_{i=1}^{N} y_i(t)\right\}, \tag{1}$$

$$x_i(t) \geq \sum_{j=1}^{N} a_{ij}(t)x_j(t) + \sum_{j=1}^{N}\sum_{\tau=t}^{t+T_j-1} f_{ij}(t)\alpha_j(t-\tau+T_j)z_j(\tau) + E_i(t) + y_i(t), \tag{2}$$

$$z_i(t) \geq x_i(t+1) - (1-p_i(t))x_i(t), \tag{3}$$

$$x_i(t+1) \geq x_i(t), \tag{4}$$

$$x_i(t+1) \leq b_i(t)x_i(t), \tag{5}$$

$$y_i(t) \geq \bar{y}_i(t), \tag{6}$$

$$\sum_{i=1}^{N} l_i(t)x_i(t) = L(t), \tag{7}$$

$$x_l(t) = \sum_{i=1}^{N} c_{li}(t)x_i(t), \tag{8}$$

$$K(t) = \sum_{j=1}^{N}\left(1 - \sum_{i=1}^{N} a_{ij}(t)\right)x_j(t) - \sum_{i=1}^{N} y_i(t) - \sum_{i=1}^{N} h_i(t)E_i(t), \tag{9}$$

$$K(t) \geq d(t)K(t-1). \tag{10}$$

The restrictions of (6) establish that nonproducive consumption of various types of output each year for the period examined should be no less than the prescribed value. The fulfillment of these prerequisites will enable the desired structure of the consumption fund to be maintained to a known extent and its minimal necessary growth to be guaranteed.

Equation (8) does not affect solution of the model but it enables the production sphere's requirements for useful energy and various energy resources for the corresponding national economic development variant to be assessed approximately.

A schematic diagram of the interaction of the models is shown in figure 1. It is described in more detail in [6].

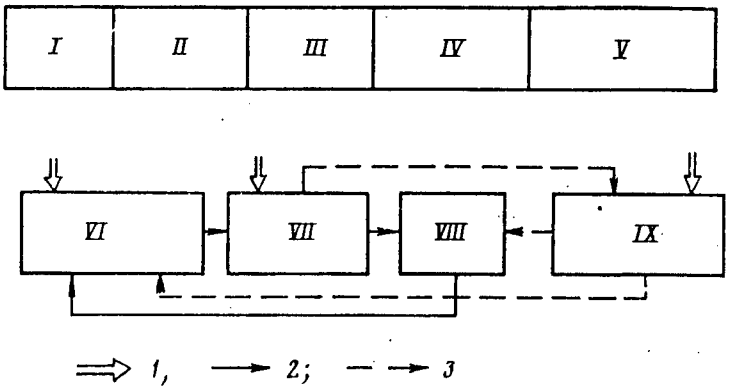


Figure 1. A System of Models for Studying the Interdependence of Power Engineering and the Economy:

I. Development of the economy.
II. The requirement for power.
III. The structure of the TEK [fuel and power complex].
IV. The capital investment and resources required.
V. Directions for additional savings of energy.
VI. The MIDL model.
VII. The TEK model.
VIII. The IMPAKT model.
IX. The model of energy-saving strategies.

1. The scenario's variables.
2. The main information links.
3. Additional links.

Each series of calculations starts from introduction of an initial hypothesis about labor resources, the rate of labor productivity growth, and materials and capital intensiveness in each of the six sectors of the economy that were singled out. Moreover, the TEK's requirement for the output of these sectors which corresponds to the base (reference) variant is given. The corresponding dynamic of macroeconomic indicators and the national economy's requirement for useful energy are established in accordance with these initial data for the MIDL model. The variants for covering these requirements are determined for TEK-development model. Among other factors, the reserves of

primary energy resources that are extracted and possible scientific and technical progress in the production, transformation, transporting and use of energy resources, the expected situation of the world energy market, and so on, are computed and varied. For each strategy for TEK development that is obtained, the IMPAKT model will enable discovery of the dynamics of direct and indirect labor expenditures, capital investment, various types of equipment and materials, limited natural resources, and waste that pollutes the environment. All these indicators serve as an auxiliary description of the energy strategies that are being examined. They can be used for "screening" some of them.

The calculations are concluded with an assessment of the possible effect of certain strategies for developing power engineering on the dynamics of the macroeconomic indicators. For this purpose, direct expenditures for labor and various types of energy output are aggregated up to a listing for the macroeconomic model and are transferred to this model as a mandatory requirement of the fuel industry and of electric-power engineering.

A comparison of the values obtained for national income and the consumption fund with the base variant's indicators show the relative national economic effectiveness of the energy strategy studied. Additionally, the differences in the requirements for useful energy that are obtained in the MIDL model during its first and second calculations are checked. If these differences exceed 1.5-2 percent, then still another iteration is performed.

In order to reduce the negative effect of the TEK's increased capital and materials intensiveness on the national economy, an accelerated (compared with the base variant) reduction of the energy intensiveness of national income by additional large-scale energy-saving measures can prove to be desirable. In order to evaluate a rational pace for reducing the energy intensiveness of the national income, the described system of power engineering and economic models should be supplemented by a model for comparing energy-saving strategies (figure 1). The possible scale of savings of energy and of the resources it requires are determined by comparing the various methods for producing the more energy-intensive types of industrial output and also the various areas for energy-saving policy in construction and transport. In so doing, the cost of fuel and electricity is taken as equal to the highest governing industrywide costs which are obtained for the TEK model. The total requirement for the final energy is revised according to the results of the computations, while the additional capital investment and material consumption that are required for realizing the energy-savings policy are detailed in the IMPAKT model. The aggregate national-economic consequences are evaluated in the macroeconomic model.

Since the purpose of the computations is not to search for "optimal" or "most probable" variants for developing the TEK but to analyze new trends in the interdependence of power engineering and the economy and to assess the possible economic problems of converting to new sources of energy and the ways of overcoming them, there is no necessity to strive to obtain "exact" solutions or to achieve a full reduction of iterative procedures, the more so because the indeterminacy of the original information in these calculations is great.

Experimental Assessment of the Effect of Power-Engineering Strategies on Economic Growth

Over the long term, as analysis indicates, the rate of growth of capital investment in the TEK grows in nonlinear fashion with increase in the pace of its development, exceeding the latter. In so doing, it strongly depends upon the structure of the power-engineering balance. The greater the share of nuclear power in it and the more widely it is used for producing electricity for centralized heat-supply and energy-technology processes, the more slowly that capital investment in the TEK grows and the weaker the economic consequences of this trend.

Let us examine two arbitrary variants for TEK development in the first 20 years of the next century, which are distinguished primarily by the role of nuclear power. In the first (the base) one, it rises at a fairly rapid average annual pace, and its share in total output of primary energy resources reaches a considerable figure by the end of the period described. Such rapid growth requires a substantial corresponding raw-material and machine-building base, timely production mastery and accelerated introduction of breeder reactors and then also of hybrid thermonuclear reactors, adequate operating time before failure for secondary nuclear fuel, and the solution of a number of serious scientific and technical problems, including those associated with the storage of a large amount of radioactive waste. A setback in just one of these measures can slow the rate of growth of nuclear power engineering.

The second variant is distinguished from the base one by slower development of nuclear power. In order to compensate for the deficit of power-engineering resources for the second variant that thus arises, the following are called for: assimilate new and very expensive fields of natural gas in Siberia, for use at electric-power stations and boilerhouses in the European part of the country; greatly expand the use of solar energy and other very capital-intensive renewable energy sources; greatly increase coal mining; increase synthetic liquid fuel production and reduce correspondingly the level of automotive-transport electrification and power-supply decentralization.

All these measures will increase capital investment in the TEK in comparison with the base variant. Moreover, investment for additional development of machinebuilding, metallurgy, the construction industry, transport and other industries associated with the TEK will be required. In this case, capital investment in the nonproductive sphere and in group B type industries will be reduced.

Such a supplemental diversion of national economic resources to compensation for inadequate development of nuclear power can, according to the calculations, lead to an increase in the accumulation norm, to a reduction in capital-investment effectiveness, and to a slowing of economic growth in comparison with the base variant.

A relative reduction in the consumption fund during an increase in the capital and materials intensiveness of the TEK is accompanied by a change in its structure: the share of durable goods falls and the share of products of the

food and light industries grows. Also changed is the structure of the gross social product--machinebuilding's share is reduced considerably.

Calculations indicate that the effect of the change in structure and capital investment of the TEK on the macroeconomic indicators is a function of the conditions for developing the economy: the weaker the effect, the higher the effectiveness and flexibility of the economy. It follows from figure 2, which is a generalized multivariant study based upon the MIDL model, that the forecasts can disregard the effect of the TEK on economic growth during an increase in the rate of growth of expenditures on its functioning and development even by 3-4 percent if, in the initial variant, the national economy is developed effectively and at a high pace and a relatively small portion of the gross social product (VOP) goes to TEK needs. However, under unfavorable conditions for developing the economy (slowed rates, a strained balance of labor resources and capital investment, a great time-lag factor, and so on) or where power engineering consumes more than 5-6 percent of the VOP, an additional increase in the rate of increase in expenditures for the TEK (because of increase of its capital intensiveness and change in its structure) can exert an appreciable adverse effect on the dynamics of the macroeconomic indicators.

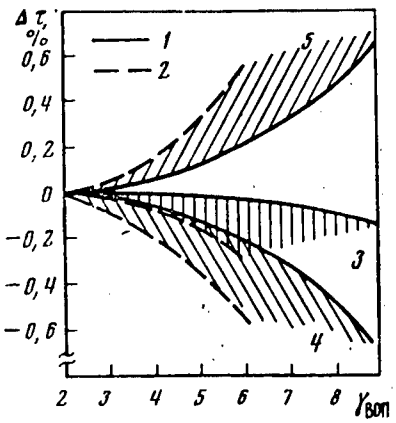


Figure 2. Change in Rate of Growth of Macroeconomic Indicators ($\Delta\tau$) Where the Rate of Growth of Expenditures for the TEK [Fuel and Power Complex] Increased by 1 Percent as a Function of Their Share in the VOP [Gross Social Product] ($\gamma_{ВОП}$) and of the Conditions for Developing the Economy:

1. Favorable.
2. Unfavorable.
3. National income.
4. The consumption fund.
5. Gross capital investment.

This does not at all mean a need to hold back on financing the TEK, to restrict its development artificially. A shortage of fuel or energy will lead to substantially greater economic damage than an increase in the capital intensiveness of power engineering. The adverse national economic consequences of such an increase can be weakened considerably by intensifying social production, reducing its materials intensiveness and implementing urgent power-savings policies.

Calculations indicate that, in order to compensate for the adverse effect of a 1-percent increase in the growth rate of capital and materials intensiveness on the economy, one of the following measures, for example, would suffice: an increase in the average annual growth rate of labor productivity in agriculture by 0.5-1 percent or, in the production sphere as a whole, by 0.15-0.3 percent, a speedup in the reduction of materials intensiveness in machinebuilding by 1.0-2 percent per year or a slowing of the rate of growth of capital intensiveness in the raw-materials branches by 2.5-3.5 percent.

More effective expenditure of power-engineering resources promotes an active influence on these and other factors for intensifying material production. At the same time, the conduct of special energy-saving measures when fuel and power become more expensive affects positively the effectiveness of the whole national economy's development.

All the areas for improving the power-engineering activity, the same as changes in the structure of material production and its effectiveness, are reflected in the dynamics of the national income's energy intensiveness in accordance with the gross expenditure of primary energy resources. The task of systematically reducing this integrated indicator is becoming increasingly urgent. If, at the price of additional capital investment in energy-saving measures, an annual drop in power intensiveness of national income by 1 percent below the expected trend could be provided for, then this would enable the average annual rate of growth of the consumption fund to increase by at least 0.1-0.2 percent of a point.

In conclusion, the following must be noted. The quantitative analysis that has been made, for all its arbitrariness, indicates that in the long term prospect, mutually related and substantial changes in the capital intensiveness, structure and rate of TEK development can affect considerably the dynamics of macroeconomic indicators. In an actual situation, this influence apparently will be even stronger than computed, since the proposed mathematical-economics models do not apply a number of important factors and relationships. Not considered, in particular, is a reduction of the potential for intensifying the economy when, because of a worsening of conditions for TEK development under various variants, greater additional capital investment is required, which does not raise the level of electrification or the state of provisioning of the national economy with fuel and energy. Also not considered is the adverse effect on labor productivity growth by a relative reduction of the nonproduction consumption fund, which is pertinent to certain variants for developing the TEK in the long term.

The importance of studying the possible national economic consequences of various long-term power-engineering strategies (including the energy-saving strategy) and the necessity for further improving the appropriate methods and models follow from what has been said.

BIBLIOGRAPHY

1. Kononov, Yu. D. Sostoyaniye i tendentsii issledovaniy vzaimosvyazey energetiki i ekonomiki za rubezhom. Dostizheniya i perspektivy [The Status of and Trends in Research Abroad of the Interdependence of Power Engineering and the Economy. Achievements and Prospects]. Issue No 14, Energetika. Toplivo [Power Engineering, Fuel]. Moscow: MTsNTI [International Center of Scientific-Research Information]. KSA under the Presidium of the USSR Academy of Sciences, 1981.

2. Gershenzon, M. A. "Interindustry Models for Forecasting." In the book, Ispol'zovaniye mezhotraslevykh modeley dlya dolgosrochnogo prognozirovaniya energetiki [The Use of Interindustry Models for Long-Range Forecasting

for Power Engineering]. Irkutsk: SEI SO AN SSSR [Siberian Power-Engineering Institute of the Siberian Department of the USSR Academy of Sciences], 1979.

3. Metody i modeli dlya issledovaniya optimal'nykh napravleniy dolgosrochnogo razvitiya toplivo-energeticheskogo kompleksa [Methods and Models for Research of Optimal Directions for the Long-Term Development of the Fuel and Power Complex]. Irkutsk. SEI SO AN SSSR, 1977.

4. Kononov, Yu. D., Korneyev, A. G. and Tkachenko, V. Z. "Modeling of External Production Ties of a Branch-of-the-Economy System." EKONOMIKA I MATEMATICHESKIYE METODY, Vol XV, No 5, 1979.

5. Kononov, Yu. D., Lyubimova, Ye. V. and Tyrtyshnyy, V. N. "Possible National Economic Consequences of the Growth of Capital and Materials Intensiveness of the Fuel and Power Complex." In the book: Systemy energetiki--tendentsii razvitiya i metody upravleniya [Power Engineering Systems--Trends of Development and Control Methods]. Vol 5. Irkutsk: SEI SO AN SSSR, 1981.

6. Kononov, Yu. D. Energetika i ekonomika (problemy perekhoda k novym istochnikam energii) [Power-Engineering and the Economy (Problems of Converting to New Energy Sources)]. Moscow: Nauka, 1981.

11409
CSO: 1822/209

UDC 330.524:620.9

SEMINAR TELLS HOW OIL INDUSTRY CAN SAVE ENERGY, MATERIALS

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 2, Feb 84 pp 73-74

[Article by N. Z. Pokonov: "The Rational Use of Fuel, Power and Material Resources"]

[Text] A seminar of workers of the power-engineering services of Minnefteprom [Ministry of Petroleum Industry] convened in May 1983 at the VDNKh SSSR [USSR Exhibition of Achievements of the National Economy], at the Oil Industry and Gas Industry Pavilions, on the matter of "The Organization of Work to Make Rational Use of Fuel and Power Resources and the Tasks of the Power-Engineering and Technological Services of Minnefteprom Enterprises," and it examined the status of the work to save fuel and power resources [TER's] within the industry. Taking part in the seminar's work were specialists from Minnefteprom, USSR Gosplan, Mingazprom [Ministry of Gas Industry], Glavgosenergonadzor, USSR Minenergo [Ministry of Power and Electrification], scientific-research, design and training institutes of the petrochemical and gas industries, and the Leningrad Mining Institute imeni G. V. Plekhanov.

V. D. Kudinov, head of Minnefteprom's Administration of the Chief Power Engineer, opened the session with the report, "The Status of and Ways for Improving the Utilization Effectiveness of TER's in the Industry."

VNIPItermneft' representatives [All-Union Scientific-Research and Design Institute for the Oil Refining and Petrochemical Industries] N. I. Litvinenko and Yu. F. Brylov made reports about improvements in planning and norm-setting and about the status of the recording and reporting of TER consumption within the industry. Questions of meeting the goals on consumption norms and organizational and technical measures for saving electricity, thermal energy and boiler and furnace fuel in 1982 and implementing the principal measures for saving them in 1983 were examined in reports of the chief power engineers of Surgutneftegaz [Surgut Oil and Gas Production Association] and Tatneft', Bashneft', Mangyshlakneft', Komineft' and Kuybyshevneft' [Tatar, Bashkir, Mangyshlak, Komi and Kuybyshev Oil Production Associations].

The report of Chief Power Engineer S. S. Dynin of Glavtransneft' [Main Administration for the Transporting and Delivery of Oil] reported on ways to increase the utilization effectiveness of electricity at oil-pipeline transport enterprises. Ye. V. Russo, supervisor of a VNIISPTneft' group, reported on the use of a regulated drive with the STD-6300 electric motor on a trunk-line

pump. S. Sh. Akopyan, chief of Soyuznefteavtomatika [All-Union Association for Automation of the Oil Industry], examined in detail in his report the technical level of the industry's boilerhouse facilities and ways of improving boiler and furnace fuel utilization effectiveness.

The seminar noted the good results that Kuybyshevneft', Bashneft', Udmurtneft' and Nizhnevolzhskneft' [Udmurt and Nizhnevartovsk Oil Production Associations], the Administration of the Druzhba Oil Pipeline, and others obtained in saving TER's. All the industry's enterprises are participating in the All-Union Social Inspection of the Utilization Effectiveness of Raw and Other Materials and of TER's that was announced by AUCCTU, the Komsomol Central Committee and USSR Gossnab.

At the same time, reliable and economical schemes for electric-power supply and the electrical equipment of oil and gas field facilities, oil pipelines, and oil and gas refineries and treatment plants, as well as outfitted illuminating installations that are based upon slotted light guides that are being used successfully in explosion-prone areas of oil-pump stations on oil trunk pipelines, especially on the Druzhba oil pipeline, are not being introduced fully. The quality of the designs of electrical-installation and setting-up operations for introducing the industry's power facilities do not always correspond to the rising requirements of oil and gas industry development. Some associations and enterprises are not fully analyzing TER overconsumption by workers of the power-engineering and technological services; the solution of the problem of a heat supply for drill rigs, to replace electrical heating, is being delayed; little attention is being paid when designs are being developed to the chapter on rational TER consumption by technological and power-engineering equipment and measures for saving furnace fuel; and many heat and fuel consuming facilities do not have instruments for recording fuel consumption and heat generation, preventing establishment of optimal modes for using these facilities and of the amount of TER consumption.

After hearing and discussing the reports and addresses, the seminar's participants recommended the following:

1. Consider the execution of organizational and technical measures for fulfilling the prescribed tasks on savings and TER consumption norms to be most important tasks of the industry's enterprises and organizations.

2. Concentrate the work of power-engineering and technological-services collectives of enterprises on the active introduction of measures aimed at insuring strict practices for saving TER's. For these purposes, provide for: the operation of power-engineering and technological equipment at more economical settings; the reduction of losses of electricity and heat in the grids by rebuilding them and creating reliable energy-supply schemes; the introduction into operation of progressive, less energy-intensive technological processes; the introduction of new and modernized power equipment; optimization of the operation of low-flow and periodically operated wells; the conversion of heating systems from steam to hot water; an increase in the efficiency of furnaces by introducing more economical burners; equipping fuel-consuming installations with recording instruments; improvement of the system for reporting and monitoring TER consumption; and improvement of the use of secondary energy reserves.

3. Reduce gas losses to a minimum at GPZ's [gas-treatment plants] during the treatment and consumption of TER's for in-house needs by introducing organizational and technical measures.

4. While executing technological processes for treating gas at GPZ's, use automated regulation to the maximum and responsively monitor and regulate the technological parameters as well as the workload of transfer pumping units.

5. Beginning in 1984, organize methodics seminars on setting norms for making rational use of TER's, under VNIPItermneft'. The Administration of the Chief Engineer and the Standards Section of NPO Soyuztermneft'[All-Union Science and Production Association for Thermal Treatment of Oil Wells] must make up and confirm for Minnefteprom's supervision a schedule for conducting these seminars during 1984-1985 and must bring it to the attention of the industry's enterprises.

6. Minnefteprom's oil-transporting enterprises must insure fulfillment of the established tasks and norms for consuming energy as a result of carrying out planned measures for cleaning inner oil-pipeline surfaces of paraffin, for optimizing oil-transfer pumping modes, and for using replaceable rotors on pump units.

7. Develop for the oil industry a number of hot-water boilers in modularized transportable versions, fully prepared at the factory, which come up to the modern level in metal consumption, efficiency and automation, with capacities of 0.3 to 10 MW, and organize the serial output thereof.

8. Charge Soyuznefteavtomatika with developing a list of recommended measures for increasing economy in using boiler and furnace fuel in heat-consuming installations.

9. Consider it expedient to assign to VNIISPT the task of developing scientifically substantiated norms for materials consumption when repairing arterial units.

10. Charge Giprotruboprovod [State Institute for the Design of Trunk Pipelines] with developing a design for converting to open-cycle ventilation of STD-6300 and STD-8000 electric motors, with the simultaneous conversion to air cooling for the oil-supply systems.

11. VNIPItermneft' should make recommendations on setting norms and on the rational use of TER's during oil and gas well drilling.

12. Minnefteprom's Administration of the Chief Power Engineer and UKS [Capital Construction Administration] must charge one of the design institutes with designing a heat supply for a drill rig, including a design for an automated boiler.

11409
CSO: 1822/209

GENERAL

POTENTIAL FOR MINIMAL COST, MAXIMUM SAFETY ENERGY RESOURCE

Kishinev SOVETSKAYA MOLDAVIYA in Russian 16 Mar 84 p 4

/Article by V. Postolatiy, candidate of technical sciences, director of the Department of Energy Cybernetics under the MoSSR Academy of Sciences, and chairman of the Problem Council: "New Frontiers for Electric Power Engineering"/

> /Text/ Last year our country witnessed the adoption of the Energy Program. This extremely important document outlines the new frontiers of Soviet electric-power engineering; it provides for the establishment of an electric-power engineering base for successfully developing the country's entire national-economic complex for the next 20 years, as well as for reducing energy consumption in production, and increasing the savings of fuel-and-energy resources at all levels of their utilization.

Progress in electric-power engineering, just like that in other sectors of the national economy, is unthinkable without utilizing the up-to-date achievements of science and technology, the fundamental and applied developments which ensure the solution of basic problems.

The principal task now confronting scientists working in the field of electric-power engineering is to ensure the development of a system of measures (including sources and means of transport) for a guaranteed energy supply of the whole national-economic complex with the minimum possible outlays and ecological safety....

The activities of practically all the scientific-research sub-divisions of our country have been subordinated to the solution of this problem and the local ramifications stemming from it. A specific range of problems in this field are also being solved by the staff of the Department of Energy Cybernetics under the MoSSR Academy of Sciences.

Our principal object of study comprises the republic-level energy system and certain electricity-consuming sectors. At the same time, the range of interests of the department's staff members is quite wide. It includes problems of electrical engineering and electro-physics, as well as fundamental problems

of systems research on electric-power engineering. Certain developments are a component part of the All-Union, targeted, comprehensive programs, while others are being carried out for regional interests. It should be emphasized that the rather high scientific potential, good material base, constant ties with Moldglavenergo /MoSSR Main Administration of Power and Electrification/ and other sectors of the republic's national economy, and, finally, close cooperation with analogous All-Union scientific organizations allow us to successfully solve the most pressing electric-power engineering problems of the present day and the future.

In the laboratory for the study of energy-systems conditions, for example, successful work is being done to develop algorithms and programs for calculating normal and extreme conditions of energy systems. These projects are of great interest for Moldglavenergo's dispatcher service. Research on and the development of models for evaluating the expenditure characteristics of the Moldavskaya GRES's electric-power units, included among the station's ASU /automatic control system/ problems , are being utilized to optimize schedules and to select assembly-units.

Extremely timely are the studies on and the development of electric-power transmission lines which, in conjunction with the Department of Electrical Systems of the Moscow Electric-Power Engineering Institute and a number of other organizations, have been carried out by our department's laboratory of controlled electric-power transmissions and high-voltage test laboratory. The introduction of this development allows us to increase the through-put capacity of a.c. electric-power transmission lines by 10--30 percent, to reduce losses of electric power, and to ensure the stability of voltage. Moreover, there is a substantial reduction in the area of lands spoiled for agricultural purposes by being under the construction of such lines; there is also a decrease in the degree of their negative effects on the ecology.

The first of the new type experimental-industrial LEP's /electric-power transmission lines/ have already been constructed, positive experience in operating them has been accumulated, and "available,"as they say, are all the prerequisites for attaining a high national-economic effect.

The electrification of agriculture has caused particular problems. It must be stated that Moldavia's agriculture accounts for 25 percent of the total consumption of electric power. There are quite a few unsolved problems here. Moreover, many of them require unified efforts on an inter-departmental level along with precisely defined coordination. In connection with this, in conjunction with the republic's Ministry of Agriculture, an inter-departmental laboratory was organized two years ago to study the reliability and to set norms for supplying electric power to major agricultural consumers. It has conducted an analysis of the distribution networks of a number of the republic's regions, discovered the characteristic causes of breakdowns, and provided concrete suggestions with regard to ensuring the required indicators of the reliability of their operation. However, further joint efforts are needed on the part of the laboratory, design organizations, enterprises, and farms of this sector with regard to solving problems very important for the republic for increasing the reliability and quality of the electric-power supply to responsible consumers of agricultural production.

Such a sector as land reclamation is extremely energy-consuming. The large pump units of traditional manufacture possess a number of shortcomings. Their conversion to a regulated electric drive ensures a notable saving of electric power, improves the system's schedule characteristics, and provides a substantial economic effect. Projects along these lines, being carried out by the laboratory on regulated electric drive, are likewise timely for other purposes, in particular, for community water supply, a number of engineering processes in industry, etc.

A major problem on which the scientists have been working is the creation for the republic's energy system of sources of reactive capacity, based on high-voltage capacitor units. The fact is that the need of the energy system for sources of reactive capacity is very great. For each kilowatt of active capacity produced at electric-power stations, at least 0.6 kilovolt-amperes of reactive capacity are required. As of today, however, the republic's energy system has been provided with only half of this amount.

Taking the requirements of the Energy Program into account, we have begun to work out a forecast of the development of the republic's energy system for the upcoming five-year plan and for the distant future. It provides for the selection of the optimum distribution of electric-power engineering projects, sources, networks, as well as recommendations with respect to administering the energy system, and introducing new installations and apparatus, along with progressive, energy-conserving technologies.

The Energy Program also sharply poses the problem of the maximum utilization of all potential energy resources. How can we compensate for the shortages in our energy balance? There are quite a few ways to solve this problem. For example, the use of solar power to obtain moderate-temperature heat. Our country's own developments already in existence are quite effective for this purpose. The trouble is that, up to now, they have not been put into serial production. Obviously, we should seek out the possibility of organizing the production of such units within this republic by means of creating a workshop, based at one of our machine-building enterprises.

Another important trend under Moldavian conditions is the construction of bio-energy units at large livestock-raising complexes. Concentrated in their technical waste-products is the solar energy accumulated by means of plant photosynthesis. Along with an energy product (combustible bio-gas), the bio-energy units solve in a cardinal manner the problem of rendering harmless the waste products of these complexes; they speed up their utilization for increasing soil fertility; they allow us to ensure in a new way the ecological balance and purity of the environment, which is very important under the conditions of the republic's highly productive agriculture and great population density.

Here too we do have specific developments and experience. But we need an enterprise which could set up and regularize the output of equipment for bio-energy units.

A large reserve for economizing on fuel and energy is the creation at enterprises of heat-accumulating units and implementing, with their help, a regulation of the daily schedules of electrical and thermal loads.

Concentration of the republic's scientific forces on solving the most important problems of electric-power engineering, strengthening the ties between science and production, the persistent implementation of the energy-conserving policy, and the widespread attraction of the scientific and technical community into implementing the Energy Program--all this will allow us to ensure a high pace of progress for this extremely important sector of the national economy.

2384
CSO: 1822/225

END